This copy is a reprint which includes current pages from Change 1.

ARMY TM 11-5830-340-30
NAVY EE105-FE-MMA-010/W110-VICIV

TECHNICAL MANUAL

DIRECT SUPPORT MAINTENANCE

HOW TO USE THIS MANUAL PAGE iii

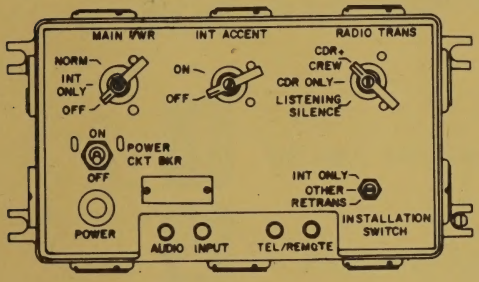
EQUIPMENT DESCRIPTION AND DATA PAGE 1-2

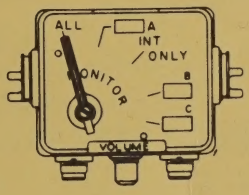
PRINCIPLES OF OPERATION PAGE 1-6

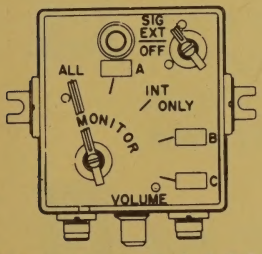
TROUBLESHOOTING PAGE 2-1

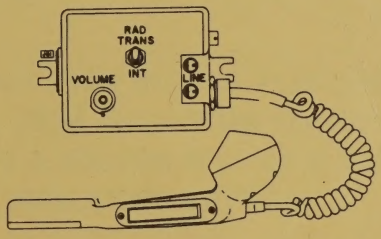
MAINTENANCE PROCEDURES PAGE 2-55

ILLUSTRATED LIST OF MANUFACTURED ITEMS PAGE C-1









INTERCOMMUNICATION SET AN/VIC-1(V) (NSN 5830-00-856-3273)

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DEPARTMENTS OF THE ARMY AND THE NAVY
15 SEPTEMBER 1986

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL
2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL
4. SEND FOR HELP AS SOON AS POSSIBLE
5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

SAFETY PRECAUTION

REVIEW THE SAFETY IDEAS IN TB 385-4 (SAFETY PRECAUTIONS FOR MAINTENANCE OF ELECTRICAL/ELECTRONIC EQUIPMENT).

When the equipment is operated with covers removed, DO NOT TOUCH exposed connections or components. MAKE CERTAIN you are not grounded when making connections or adjusting components inside the equipment.

If someone is a victim of ELECTRICAL SHOCK, follow the FIVE SAFETY STEPS given in the SAFETY INSTRUCTIONS in the front of this manual.

DO NOT SERVICE OR ADJUST EQUIPMENT ALONE!!!

Do not attempt internal service or adjustment unless another person, capable of giving FIRST AID and RESUSCITATION, is PRESENT.

WARNING

Do not be misled by the term "low voltage". Potentials as low as 50 volts can cause death under adverse conditions. Remove or tape all exposed personal metal objects such as watches, rings or medallions before working on equipment.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

For Artificial Respiration, refer to FM 21-11.

Technical Manual
No. 11-5830-340-30
Technical Manual
No. EE105-FE-MMA-010-W110-VICIV

DEPARTMENTS OF THE ARMY
AND THE NAVY

Washington, DC, 15 September 1986

DIRECT SUPPORT MAINTENANCE MANUAL INTERCOMMUNICATION SET AN/VIC-1(V) (NSN 5830-00-856-3273)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander. US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ME-PS, Fort Monmouth, New Jersey 07703-5000.

For Navy, mail comments to the Commander, Space and Naval Warfare Systems Command, ATTN: SPAWAR 8122, Washington, DC, 20363-5100.

In either case a reply will be furnished direct to you.

*This manual supersedes TM 11-5820-401-30-4, 4 Aug 1976, TM 11-5820-401-35-6, 1 November 1973, TM 11-5820-401-35-7, 16 April 1973, TM 11-5820-401-35-8, 1 November 1973 and TM 11-5830-257-30&P, 26 January 1981.

		Page
	HOW TO USE THIS MANUAL	iii
CHAPTER 1	INTRODUCTION	1-1
Section I	General Information	1-1
	1-1. Scope	1-1
	1-2. Maintenance Forms, Records, and Reports	1-1
	1-3. Reporting Equipment Improvement Recommendations (EIR)	1-1
	1-4. Administrative Storage	1-1
	1-5. Destruction of Army Electronics Materiel	1-1
	1-6. Consolidated Index of Army Publications and Blank Forms	1-1
Section II	Equipment Description and Data	1-2
	1-7. Equipment Characteristics, Capabilities, and Features	1-2
	1-8. Description of Major Units	1-2
	1-9. Audio Accessories	1-3
	1-10. Radios and Mounts	1-3
	1-11. Difference Data	1-3
	1-12. Equipment Data	1-4
	1-13. Safety, Care, and Handling	1-5
Section III	Principles of Operation	1-6
	1-14. System Overview	1-6
	1-15. AM-1780/VRC	1-6
	1-16. C-2298/VRC	1-7
	1-17. C-2297/VRC	1-8
	1-18. C-2296/VRC	1-8
	1-19. C-10456/VRC	1-8

TABLE OF CONTENTS – Continued

		Page
CHAPTER 2	DIRECT SUPPORT MAINTENANCE	2-1
Section I	Repair Parts, Special Tools, TMDE, and Support Equipment	2-1
	2-1. Common Tools and Equipment	2-1
	2-2. Special Tools, TMDE, and Support Equipment	2-1
	2-3. Repair Parts	2-1
Section II	Troubleshooting	2-1
	2-4. General Troubleshooting	2-1
	2-5. AM-1780/VRC Troubleshooting	2-1
	2-6. C-2296/VRC Troubleshooting	2-31
	2-7. C-2297/VRC Troubleshooting	2-36
	2-8. C-2298/VRC Troubleshooting	2-41
	2-9. C-10456/VRC Troubleshooting	2-47
Section III	Maintenance Procedures	2-55
	2-10. General Maintenance Procedures	2-55
	2-11. Cleaning	2-55
	2-12. Control Box Operational Check Methods	2-55
	2-13. AM-1780/VRC Maintenance	2-56
	2-14. C-2296/VRC Maintenance	2-70
	2-15. C-2297/VRC Maintenance	2-78
	2-16. C-2298/VRC Maintenance	2-87
	2-17. C-10456/VRC Maintenance	2-91
APPENDIX A.	REFERENCES	A-1
B.	EXPENDABLE SUPPLIES AND MATERIALS LIST	B-1
C.	ILLUSTRATED LIST OF MANUFACTURED ITEMS	C-1

HOW TO USE THIS MANUAL

This manual tells you how to repair the Intercommunication Set AN/VIC-1(V) at the Direct Support level.

The front cover index is provided for quick reference to important information by general listings.

You must familiarize yourself with the entire maintenance procedure before beginning the maintenance task.

Warning pages are included in the beginning of this manual. You should study these warnings before starting any maintenance and always follow appropriate safety procedures and precautions.

Here are some typical ways to use this manual:

PROBLEM

The organizational maintenance technician told you the crew members were unable to control radio "A", connected to J501 of the AM-1780/VRC.

SOLUTION

Go to chapter 2, section II, page 2-1.

PROBLEM

You want to know how to fabricate the test cables used to troubleshoot the equipment.

SOLUTION

Go to appendix C, page C-1.

PROBLEM

You want to know how to remove and replace the microphone amplifier assembly in the C-2296/VRC.

SOLUTION

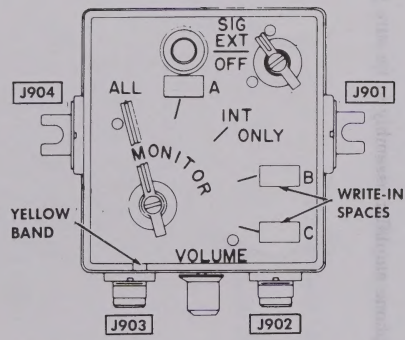
Go to chapter 2, section III, page 2-70.

PROBLEM

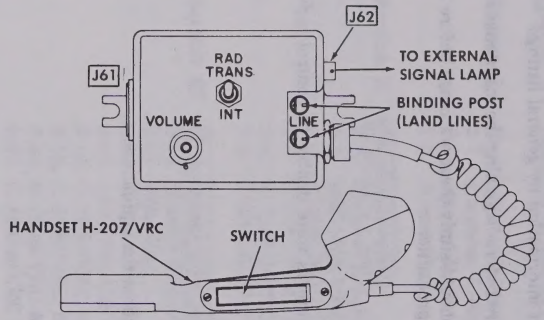
You want to check the C-2298/VRC after replacing the microphone amplifier assembly to be sure you fixed the problem.

SOLUTION

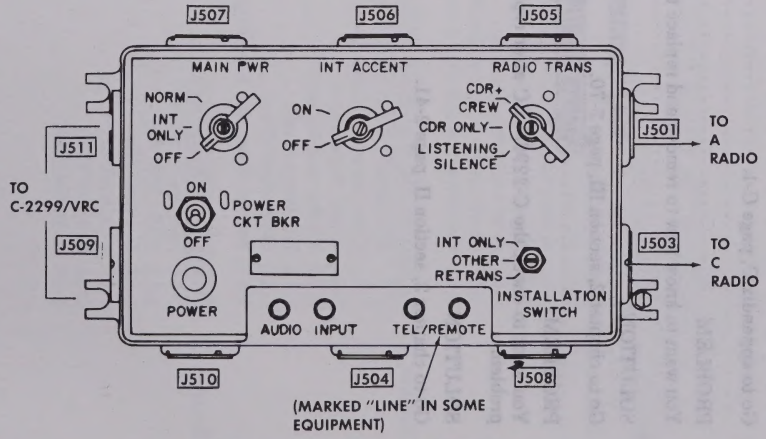
Go to chapter 2, section II, page 2-41.



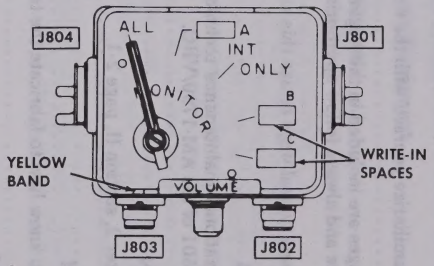
Control, Intercommunications Set C-2297/VRC



Control, Intercommunications Set C-2296/VRC



Amplifier, Audio Frequency AM-1780/VRC



Control, Intercommunications Set C-2298/VRC or C-10456/VRC

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

Type of Manual:	Direct Support Maintenance
Equipment Nomenclature:	Intercommunication Set AN/VIC-1(V)
Purpose of Equipment:	Provides voice communications between members of a crew-served weapon or between crew members of a vehicle. Also allows communications between associated radios in some installations.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS

a. *Reports of Maintenance and Unsatisfactory Equipment.* Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in Maintenance Management Update. Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol 3 and unsatisfactory material/conditions (UR submissions) IAW OPNAVINST 4790.2, Vol 2, chapter 17.

b. *Reporting of Item and Packaging Discrepancies.* Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescirbed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

c. *Transportation Discrepancy Report (TDR) (SF 361).* Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

a. *Army.* If your AN/VIC-1(V) Intercommunication Set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-PA-MA-D, Fort Monmouth, New Jersey 07703-5000. We'll send you a reply.

b. *Navy.* Navy personnel are encouraged to submit EIR's through their local Beneficial Suggestion Program.

1-4. ADMINISTRATIVE STORAGE

Before placing equipment into administrative storage, insure that equipment is operational. If operational, put into storage using appropriate corrosion control techniques. When removing from storage, again perform operational tests and Unit PMCS (if available) to determine mission capability.

1-5. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-7. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a. Characteristics

(1) Uses vehicle power (22 to 30 Vdc).

(2) Used in a wide variety of crew-served vehicles.

(3) Provides intercommunications between crew members.

(4) Allows two-way communications on selected radios.

b. Capabilities and Features

(1) All controls and receptacles are water resistant, but not watertight.

(2) Can be used in command posts by using a power supply such as PP-2953(*)/U.

NOTE

Throughout this manual, official nomenclature followed by (*) represents all models of the equipment.

(3) May be connected to battery-powered field telephones or other vehicles.

(4) Provisions are made for signal lamps to attract the attention of users both inside and outside the vehicle.

1-8. DESCRIPTION OF MAJOR UNITS

a. The following units are part of Intercommunication Set AN/VIC-1(V). Different combinations of these units may be used.

AM-1780/VRC. Provides interconnection, control, and amplification of audio frequency signals from crew member control boxes and radios.

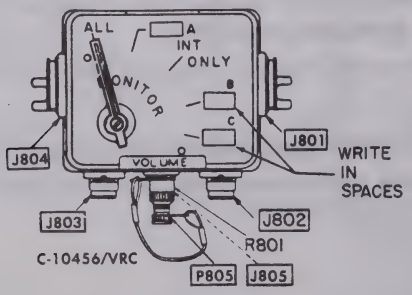
C-2296/VRC. Provides means for personnel outside vehicle to communicate with vehicle crew members or on radios.

C-2297/VRC. Controls use of C-2296/VRC if installed. Also provides intercommunication and radio communications to crew members.

C-2298/VRC. Provides intercommunication and radio communications to crew members.

b. The following unit is not part of AN/VIC-1(V). However, when it is installed in a combat vehicle with the AM-1780/VRC, the configuration may be considered an AN/VIC-1(V).

C-10456/VRC. Similar in appearance and performance to C-2298/VRC, but has provision for remote keying when used in vehicles such as the M-1 tank.



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1-9. AUDIO ACCESSORIES

The following are typically used with AN/VIC-1 and are referred to as audio accessories:

a. Handset H-189/GR

a. Microphone, Dynamic M80/U

c. Headsets H-140 A/U and H-251/U

d. Headset-Microphone H-161/U

e. Loudspeaker LS-454/U

f. Combat Vehicle Crewman Helmet DH-132A with Headset-Microphone Kit MK-1039/U installed.

1-10. RADIOS AND MOUNTS

The radios and mounts listed below are commonly used with AN/VIC-1(V):

a. Radio Sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49

b. Radio Sets AN/VRC-53, AN/VRC-64, AN/GRC-125 and AN/GRC-160

c. Receiver, Radio R-442/VRC

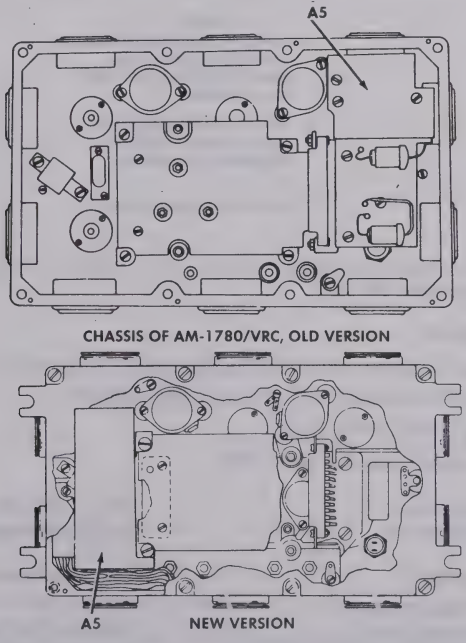
d. Mounts, MT-1029/VRC and MT-1898/VRC.

1-11. DIFFERENCE DATA

AM-1780/VRC

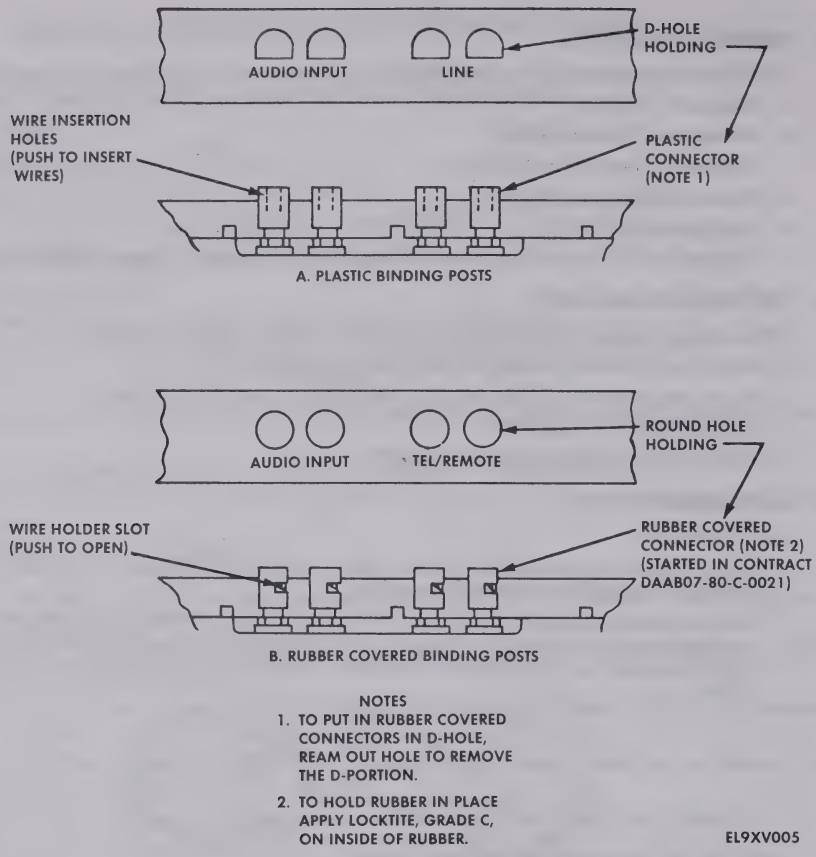
a. Some versions have a variable gain interphone amplifier A250. Later versions have a fixed gain A250B. The assemblies are interchangeable.

b. Some versions have the 25.5 Vdc filter A5, located on the end near J512. Later versions have A5 mounted on the opposite end of chassis. The assemblies are interchangeable. The later version filter rejects increased noise generated by slip rings on M109 Howitzers using a separate filter box, F-1461.



NOTE:
THE ORIGINAL VERSION OF THE FILTER ASSEMBLY, (A5) SMD-415567
CAN BE REPLACED BY THE NEW FILTER ASSEMBLY SMC-366087.

Filter Assembly Difference


AUDIO INPUT
LINE
D-HOLE HOLDING
WIRE INSERTION HOLES (PUSH TO INSERT WIRES)
PLASTIC CONNECTOR (NOTE 1)
A. PLASTIC BINDING POSTS
AUDIO INPUT
TEL/REMOTE
ROUND HOLE HOLDING
WIRE HOLDER SLOT (PUSH TO OPEN)
RUBBER COVERED CONNECTOR (NOTE 2) (STARTED IN CONTRACT DAAB07-80-C-0021)
B. RUBBER COVERED BINDING POSTS
NOTES
1. TO PUT IN RUBBER COVERED CONNECTORS IN D-HOLE, REAM OUT HOLE TO REMOVE THE D-PORTION.
2. TO HOLD RUBBER IN PLACE APPLY LOCKTITE, GRADE C, ON INSIDE OF RUBBER.
EL9XV005

Differences in Binding Posts

c. Field telephone binding posts on some versions are plastic, labeled LINE. Later versions are rubber, labeled TEL/REMOTE.

1-12. EQUIPMENT DATA

The following table lists the operational characteristics of the intercom set items of equipment.

AN/VIC-1(V) INTERCOMMUNICATION COMPONENTS

AMPLIFIER/JUNCTION BOXES

Audio Frequency Amplifier AM-1780/VRC	
Frequency range	500 to 3,000 Hz
Intercom function	Provides communication (intercom) between control boxes
Radio function	Provides control of radios selected at control boxes
Circuit Impedences:	
Microphone circuits	150 ohms ±20 percent
Headset and loudspeaker circuits	150 ohms ±20 percent

LINE binding posts	600 ohms ±20 percent
AUDIO INPUT binding posts	5,000 ohms
Radio transmitter microphone input circuit	150 ohms ±20 percent
Radio receiver audio output circuits	150 ohms ±20 percent
Operating voltage requirements	22 to 30 Vdc

CONTROL BOXES

C-2296/VRC, C-2297/VRC, C-2298/VRC

Frequency range	500 to 3,000 Hz (audio)
Intercom function	Provides communication between crew members
Radio function	Provides communication over all radio components connected to AM-1780/VRC

C-10456/VRC (M1 ABRAMS TANK) - Modified C-2298/VRC

Frequency range	500 to 3,000 Hz
Intercom function	Provides communication between crew members
Radio function	Provides access to all radios connected to AM-1780/VRC
Remote intercom/radio keying function	Provides remote keying from various M1 Abrams tank controls

1-13. SAFETY, CARE, AND HANDLING

a. Safety

(1) You must report unsafe equipment conditions to your supervisor.

(2) If equipment electrical power is on, find out where shutdown switches are before beginning maintenance. You must be able to turn power off quickly in an emergency.

(3) Read and heed all WARNINGS in the maintenance procedure you are performing. They are there to prevent injury and possible death.

b. Care

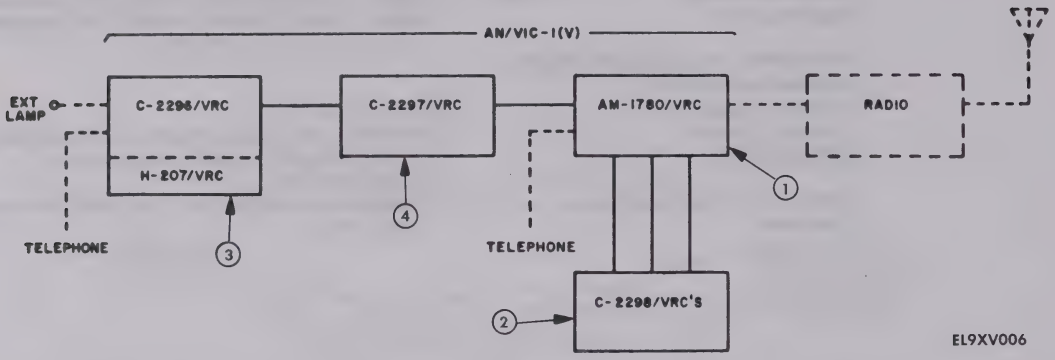
(1) Read all CAUTIONS in the maintenance procedure you are performing. They are put there to help you protect the equipment from damage.

(2) Keep your equipment clean and in operating condition.

c. Handling. The intercommunication set does not require any special handling.

Section III. PRINCIPLES OF OPERATION

1-14. SYSTEM OVERVIEW



① *AM-1780/VRC.* Distributes power to crew member control boxes. Receives intercommunication and radio audio, amplifies and distributes it to crew member control boxes. Amplifies and routes transmit audio to selected radio.

② *C-2298/VRC.* Selects radio or intercommunication for microphone output. Selects which radio audio is monitored.

③ *C-2296/VRC.* Selects radio or intercommunication for microphone output. Provides connection of external signal (call) lamp and field telephone. Must be connected to C-2297/VRC.

④ *C-2297/VRC.* Selects radio or intercommunication for microphone output. Selects which radio audio is monitored. Controls operation of C-2296/VRC.

Intercommunication Set AN/VIC-1(V), Block Diagram

1-15. AM-1780/VRC

a. General. The AM-1780/VRC includes 10 jacks for connection to radios, crew member control boxes and dc power. There are five selector switches, two sets of binding posts and an interphone amplifier.

Crew member control boxes are connected to J505 through J507. J505 through J507 are wired in parallel. The commander's control box is connected to J504.

Receiver-Transmitter may be connected to J501 and/or J503. Additional receivers may be connected to J510 and/or J508.

When two receiver-transmitters are provided, automatic relay operation may be accomplished, using a C-2299/VRC retransmission control box connected to J509 and J511.

The output of a third receiver may be connected to the AUDIO INPUT binding posts and a field telephone may be connected to the LINE binding posts.

b. Power Distribution. Figure FO-2 shows dc power distribution to and from the AM-1780/VRC.

When radios are not used with the AM-1780/VRC, dc power is applied to J508 and the INSTALLATION switch must be set to INT ONLY.

When radios are used, dc power is applied through J501 and the MAIN PWR switch must be set to NORM to supply power to the A radio set. When the POWER CKT BKR is set to ON, power is applied to the radio-intercom system.

Crew member control boxes receive dc power from the AM-1780/VRC.

c. Radio Transmission and Keying. Figure FO-3 shows the circuits involved in microphone audio and keying control signals.

Pressing the push-to-talk switch on an audio accessory applies a ground through the crew member control box and AM-1780/VRC to the radio keying relay.

Microphone audio is processed by the control box, then the AM-1780/VRC, and is sent to the radio transmission circuits.

When intercom keying relays K501 and K502 are operated the radio keying control relays are interrupted for all crew members except the crew commander (connected to J504).

d. Radio Reception. Figure FO-4 shows the radio reception circuits. When the crew member control box MONITOR switch is in the ALL position, fixed level audio from the radio is processed by the AM-1780, sent to the crew member control box and processed, and is then sent to the audio accessory.

If the INT ACCENT is set to ON, an extra attenuating resistor is added to the radio reception circuit, causing the intercom audio to appear louder (accentuated).

Fixed level audio is also processed from one radio through the AM-1780/VRC, the retransmission control box, to the second radio.

Variable level audio from the radios is processed by the AM-1780/VRC, sent to the crew member control boxes and is processed for the audio accessories.

Receiver output attached to the AUDIO INPUT binding posts are processed the same as fixed level audio.

e. Intercom Circuits. Figure FO-5 shows the circuits involved in intercom audio and intercom keying control.

The commander's control box must be connected to J504 of the AM-1780/VRC. Crew member control boxes may be connected to J505, J506, or J507.

Operating the audio accessory push-to-talk switch at the commander's control box operates relays K501, K502, and K503.

Operating the audio accessory push-to-talk switch at the crew member control boxes operates relays K501 and K502.

Relay K503 cannot be operated when relays K501 and K502 are operated. This allows the commander to transmit on radios when crew members have the intercom keyed.

With the relays operated, microphone audio is processed by the control box, sent to the AM-1780/VRC, processed, and sent back to the earphones.

Intercommunication, using a field telephone, functions the same as above, except that the push-to-talk switch must be released to hear a reply.

f. Interphone Amplifier. The interphone amplifier processes all audio signals except variable level radio audio.

1-16. C-2298/VRC

C-2298/VRC is one of the crew member control boxes that may be used in the AN/VIC-1(V) intercom set.

a. It may be connected to AM-1780/VRC or to another C-2298/VRC.

b. All power and control voltages are passed through J801 or J804.

c. J801 and J804 are wired in parallel.

d. Audio accessory attached to J802 can control keying of either radios or intercom.

e. Audio accessory attached to J803 can control keying of intercom only.

f. MONITOR switch selects audio and microphone circuit connections to J802 and J803.

g. Microphone output is amplified by assembly A80.

1-17. C-2297/VRC

C-2297/VRC is a crew member control box that may be used in AN/VIC-1(V) intercom set, driver's position.

a. Power and control voltages are received from AM-1780/VRC through J904.

b. Power and control voltages to and from C-2296/VRC are made through J901.

c. Audio accessory attached to J902 can control keying of radios or intercom.

d. Audio accessory attached to J903 can control keying of intercom only.

e. MONITOR switch selects audio and microphone circuit connections to J902, J903, and C-2296/VRC.

f. Microphone output is amplified by assembly A80.

1-18. C-2296/VRC

a. Power and control voltages are passed through J61 from C-2297/VRC.

b. External signal (call) lamp is attached to J62.

c. Handset H-207/VRC is part of C-2296/VRC.

d. LINE binding posts provide connection to land line or field telephone.

e. RAD TRANS-INT switch provides connection of handset output to radio or intercom circuits.

f. Handset output is amplified by assembly A80.

1-19. C-10456/VRC

Operates the same as C-2298/VRC with the following exceptions:

a. Remote keying of radio or intercom is provided through J805 and vehicle wiring.

b. Solid-state switch assembly A81 is used to block or pass output of microphone amplifier assembly A80.

c. With dummy plug P805 installed, remote keying function is bypassed.

CHAPTER 2

DIRECT SUPPORT MAINTENANCE

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

2-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Refer to TM 11-5830-340-23P and appendix C of this manual for the special tools, TMDE, and support equipment to maintain the intercommunication set.

NOTE

Old TMDE is being phased out and replaced by new TMDE. Refer to the Maintenance Allocation Chart in TM 11-5830-340-12 for replacement data.

2-3. REPAIR PARTS

Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 11-5830-340-23P.

Section II. TROUBLESHOOTING

2-4. GENERAL TROUBLESHOOTING

This section contains troubleshooting procedures for the intercom set. The following paragraphs give fault verification, troubleshooting data and troubleshooting actions for AM-1780/VRC, C-2296/VRC, C-2297/VRC, C-2298/VRC and C-10456/VRC.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective measures. If a malfunction is not listed, or is not corrected by the listed corrective actions, notify your supervisor.

Visual inspection will locate many faults without testing the circuits. All visual signs should be observed and an attempt should be made to localize the fault.

2-5. AM-1780/VRC TROUBLESHOOTING

a. Fault Verification. Fault verification for the AM-1780/VRC consists of checking the AM-1780/VRC to make sure the problem reported by organizational maintenance exists. This is done by performing the operational check in 2-13*a*, below. You must perform the operational check to make sure that you have solved the problem. Do this after replacing the faulty assembly.

b. Using Troubleshooting Data. When the fault symptom has been determined for the AM-1780/VRC, refer to the listing of that symptom in the following symptom index.

AM-1780/VRC SYMPTOM INDEX

Symptom	Troubleshooting paragraph
Commander cannot key intercom in C position of MONITOR switch.	2-5*c*(6)
Crew members cannot key intercom in A, ALL or B position of MONITOR switch.	2-5*c*(5)
No control of A radio (receiver-transmitter).	2-5*c*(1)
No control of C radio (receiver-transmitter).	2-5*c*(2)
No audio from B receiver.	2-5*c*(3)

Symptom	Troubleshooting paragraph
No audio from C receiver.	2-5*c*(4)
No audio through AUDIO INPUT binding posts.	2-5*c*(7)
No audio through LINE (TEL/REMOTE) binding posts.	2-5*c*(8)
POWER CKT BKR trips.	2-5*c*(11)
POWER indicator does not light.	2-5*c*(11)
Relays do not operate (click) when intercom is keyed.	2-5*c*(10)
Retransmit function does not operate.	2-5*c*(9)

c. Troubleshooting Actions. The following paragraphs provide tabular instructions to guide direct support maintenance personnel in fault isolation of the AM-1780/VRC. FO-1 is the schematic diagram for the AM-1780/VRC.

Before beginning to troubleshoot, remove the back cover from the AM-1780/VRC by loosening eight captive screws. When finished troubleshooting, apply a light coating of insulating silicone compound to preformed packing on back cover, replace back cover, and tighten screws.

NOTE

In addition to FO-1, the following foldouts may be used while troubleshooting the AM-1780/VRC:

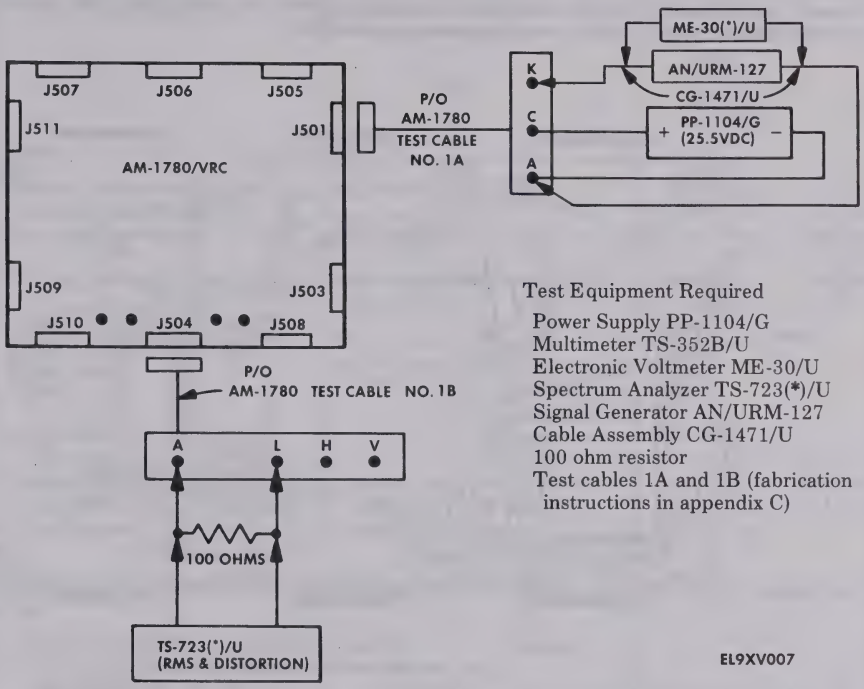
FO-2 Power Distribution Circuits of AM-1780/VRC with Radio Systems and Radio-Intercom System.
FO-3 Radio Transmission and Keying Circuits of AM-1780/VRC with Radio Systems and Radio-Intercom System.
FO-4 Radio Reception Circuits of AM-1780/VRC with Radio Systems and Radio-Intercom Systems.
FO-5 Intercom Transmission and Reception Circuits of AM-1780/VRC and Crew Member Control Boxes.

(1) Radio A Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 1A to J501.			
2	Turn off PP-1104/G and connect its positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			
3	Turn on PP-1104/G and adjust output to 25.5 Vdc.			
4	Set AM-1780/VRC switches as follows: MAIN PWR: NORM INSTALLATION: OTHER POWER CKT BKR: ON	POWER indicator should light.	Go to step 5.	Go to 2-5*c*(11).
5	Connect the output of AN/URM-127 to pins K and A (ground) of test cable 1A.			
6	Adjust AN/URM-127 output to 1 kHz.			
7	Connect test cable 1B to J504.			
8	Connect 100 ohm resistor across terminals L and A of test cable 1B.			
9	Connect the TS-723(*)/U, adjusted to measure voltage, across the resistor.			

c. *Troubleshooting Actions* - Continued

(1) Radio A Circuits - Continued



Test Equipment Required

Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Cable Assembly CG-1471/U
100 ohm resistor
Test cables 1A and 1B (fabrication instructions in appendix C)

Test Setup, Radio A Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
		NOTE		
10	Connect ME-30(*)/U to output of AN/URM-127.	**ME-30(*)/U is used to measure output level of AN/URM-127.**		
11	Adjust the output of AN/URM-127 to obtain 11 to 13 Vac on TS-723(*)/U.	Between 0.170 and 0.276 V read on ME-30(*)/U.	Go to step 22.	Go to step 12.

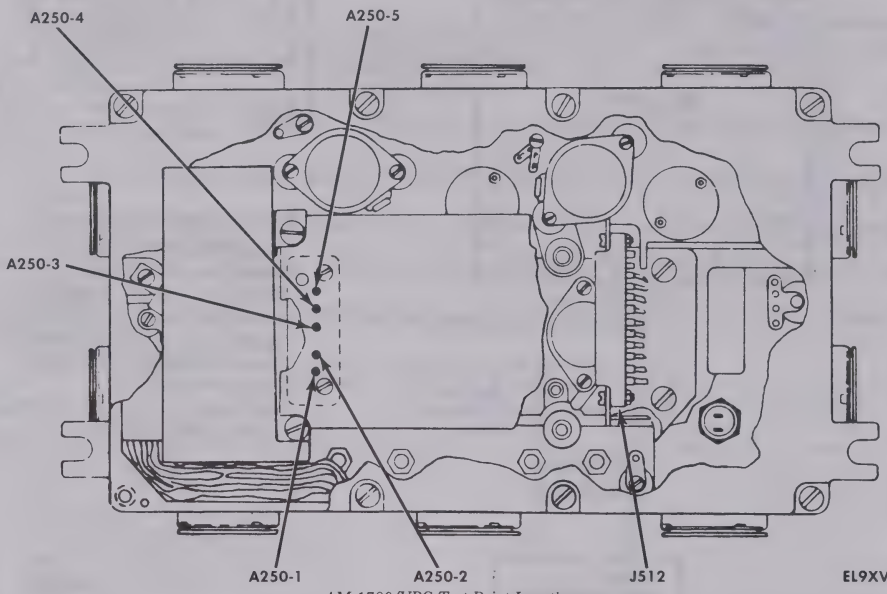
c. *Troubleshooting Actions* - Continued

(1) Radio A Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No

NOTE

For AM-1780/VRC provided with variable gain amplifier assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.

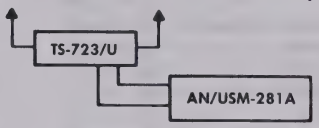


AM-1780/VRC Test Point Locations

12	Use TS-352B/U and measure dc voltage between A250-2 (ground) and A250-4.	+25.5 V.	Go to step 14.	Go to step 13.
13	Measure dc voltage between J512-A and J512-E (ground)	+25.5 V.	Replace A520.	Go to 2-5c(11)
14	Use AN/USM-281A and observe waveform at J512-7 and note amplitude.	∿ (1 kHz signal from AN/URM-127.)	Go to step 15.	Repair circuit between J501-K and J512-7.
15	Observe waveform at J512-K.	Amplifier 1 kHz signal. (Reference step 14.)	Repair circuit between J512-K and J504-L.	Go to step 16.
16	Observe waveform at A250-5.	Attenuated 1 kHz signal. (Reference step 14.)	Go to step 19.	Go to step 17.

c. *Troubleshooting Actions* - Continued

(1) Radio A Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
17	Observe waveform at J512-F.	Attenuated 1 kHz signal. (Reference step 14.)	Replace A520	Go to step 18.
18	Observe waveform at J512-1.	Attenuated 1 kHz signal. (Reference step 14.)	Repair circuit between J512-L and J512-F (INT ACCENT).	Replace A520
19	Observe waveform at A250-1 and note amplitude	Amplified 1 kHz signal.	Go to step 20.	Replace A250.
20	Observe waveform at J512-B.	Same as step 21.	Go to step 21.	Replace A520.
21	Observe waveform at J512-J.	1 kHz signal, greater amplitude than step 22.	Replace A520.	Replace A4.
22	Connect AN/USM-281A to TS-723/U OSCILLOSCOPE terminals.			
23	Adjust TS-723/U to measure distortion.			
24	Connect TS-723/U AF INPUT leads to terminals L and A of test cable 1B.	Less than 10% distortion and undistorted sine wave on AN/USM-281.	Go to step 25.	Replace A250.
		NOTE		
	For AM-1780/VRC's with fixed gain audio amplifier A250B, distortion will normally be less than 1%.			
25	Turn off power and disconnect PP-1104/G, AN/URM-127, TS-723/U and 100 ohm resistor.			
26	Set all AM-1780/VRC switches to full counterclockwise.			
27	Set TS-352B/U to measure resistance, RX1.			
28	Mesure continuity between the following points (test cables may be used to facilitate connections: J501-A to ground J501-H to J504-M J501-U to J504-K J501-T to J511-T J501-U to J511-U J501-S to J511-S J501-K to J511-K J501-U to J505-K J501-H to J505-M	0 ohms.	If continuity is not obtained, repair faulty circuit.	

c. *Troubleshooting Actions* - Continued

(1) Radio A Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
29	Set INSTALLATION switch to OTHER.			
30	Measure resistance from J501-S to J511-L.	0 ohms.	Go to step 31.	Repair faulty circuit.
31	Measure resistance from J501-D to ground.	Infinity.	Go to step 32.	Repair faulty circuit.
32	Measure resistance from 501-B to ground.	Infinity.	Go to step 33.	Repair faulty circuit.
33	Set POWER CKT BKR to ON and MAIN PWR switch to INT ONLY.			
34	Measure resistance between J501-B and ground.	Between 75 and 250 ohms.	Go to step 35.	Go to 11 2-5*c*(12).
35	Set MAIN PWR switch to NORM.			
36	Measure resistance between J501-B and J501-D.	0 ohms.	Go to step 37.	Repair faulty circuit.
37	Set RADIO TRANS switch to CDR ONLY.			
38	Measure resistance between J501-S and J504-D.	0 ohms.	Go to step 39.	Repair faulty circuit.
39	Measure resistance between J501-S and J505-D.	Infinity.	Go to step 40.	Repair faulty circuit.
40	Set RADIO TRAN switch to CDR & CREW.			
41	Measure resistance between J501-S and J504-D.	0 ohms.	Go to step 42.	Replace S502.
42	Measure resistance between J501-S and J505-D.	0 ohms.	Go to step 43.	Repair faulty circuit.
43	Disconnect test equipment and return AM-1780/VRC to operational condition.			

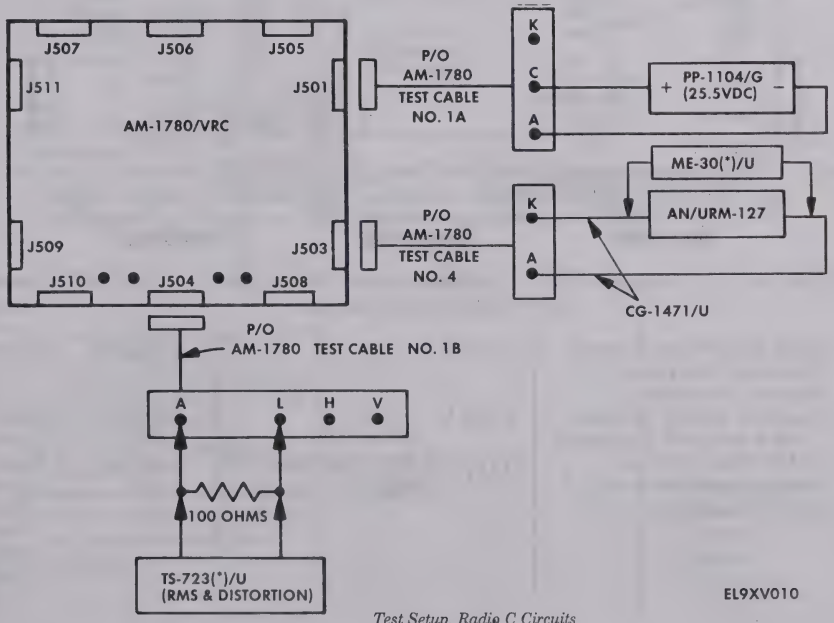
c. Troubleshooting Actions - Continued

(2) Radio C Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 4 to J503.			
2	Connect test cable 1A to J501.			
3	Turn off and connect PP-1104/G positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			
4	Turn on PP-1104/G and adjust output to +25.5 V.			
5	Set AM-1780/VRC switches as follows: MAIN PWR: ON INSTALLATION: OTHER POWER CKT BKR: ON	POWER indicator should light.	Go to step 6.	Refer to 2-5*c*(11)
6	Connect the output of AN/URM-127 to pins K and A of test cable 4.			
7	Adjust AN/URM-127 output to 1 kHz.			
8	Connect test cable 1B to J504.			
9	Connect 100 ohm resistor across terminals L and A of test cable 1B.			
10	Connect TS-723(*)/U, adjusted to measure voltage, across the resistor.			

Test Equipment Required

Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Cable Assembly CG-1471/U
100 ohm resistor
Test cables 1A and 1B (fabrication instructions in appendix C)
Test cable 4 (fabrication instructions in appendix C)



Test Setup, Radio C Circuits

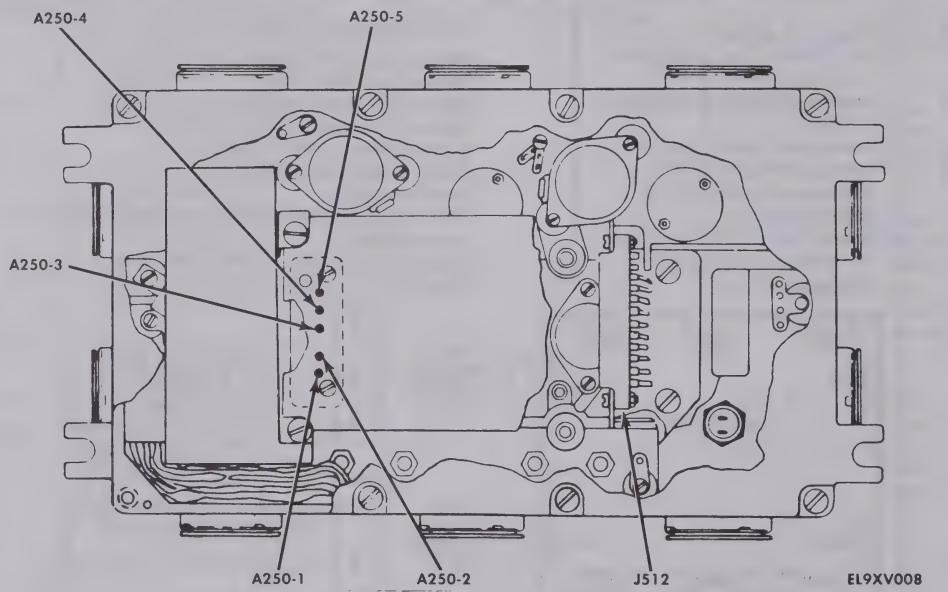
c. *Troubleshooting Actions* - Continued

(2) Radio C Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
		NOTE		
11	Connect ME-30(*)/U to output of AN/URM-127.	**The ME-30(*)/U is used to measure the output level of AN/URM-127.**		
12	Adjust output level of AN/URM-127 to obtain between 11 and 13 Vac on TS-723(*)/U.	Between 0.170 and 0.276 Vac read on ME-30(*)/U.	Go to step 23.	Go to step 13.

NOTE

For AM-1780/VRC provided with variable gain assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.

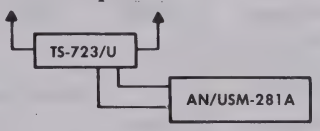


AM-1780/VRC Test Point Locations

13	Use TS-352B/U and measure dc voltage between A250-2 (ground) and A250-4.	+25.5 V.	Go to step 15.	Go to step 14.
14	Measure dc voltage between J512-A and J512-E (ground).	+25.5 V.	Replace A520	Go to 2-5c(11).
15	Use AN/USM-281A and observe waveform at J512-2 and note amplitude.	(1 kHz signal from AN/URM-127.)	Go to step 16.	Repair circuit between J501-K and J512-6.

c. *Troubleshooting Actions* - Continued

(2) Radio C Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
16	Observe waveform at J512-K.	Amplified 1 kHz signal. (Reference step 15.)	Repair circuit between J512-K and J504-L.	Go to step 17.
17	Observe waveform at A250-5.	Attenuated 1 kHz signal. (Reference step 15.)	Go to step 20.	Go to step 18.
18	Observe waveform at J512-F.	Attenuated 1 kHz signal. (Reference step 15.)	Replace A520.	Go to step 19.
19	Observe waveform at J512-1.	Attenuated 1 kHz signal. (Reference step 15.)	Repair circuit between J512-1 and J512-F (INT ACCENT).	Replace A520.
20	Observe waveform at A250-1 and note amplitude.	Amplified 1 kHz signal.	Go to step 21.	Repair A250.
21	Observe waveform at J512-B.	Same as step 20.	Go to step 22.	Replace A520.
22	Observe waveform at J512-J.	1 kHz signal, greater amplitude than step 20.	Replace A520.	Replace A4.
23	Connect AN/URM-281A to TS-723/U OSCILLOSCOPE terminals.			
24	Adjust TS-723/U to measure distortion.			
25	Connect TS-723/U AF INPUT leads to terminals L and A of test cable 1B.	Less than 10% distortion and undistorted sine wave on AN/USM-281.	Go to step 26.	Replace A250.

NOTE

For AM-1780/VRC's with fixed gain audio amplifier A250B, distortion will normally be less than 1 %.

26	Turn off power, disconnect PP-1104/G, AN/URM-127, TS-723/U, and 100 ohm resistor.			
27	Set all AM-1780/VRC controls fully counterclockwise.			
28	Set TS-352B/U to measure resistance RX1.			
29	Measure continuity between the following points (test cables may be used to facilitate connections):	0 ohms.	If continuity is not obtained, repair the faulty circuit.	

c. *Troubleshooting Actions* - Continued

(2) Radio C Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
	J503-A to ground J503-H to J508-D J503-K to J508-C J503-H to J504-J J503-U to J504-V J503-H to J505-J J503-U to J505-V J503-S to J509-S J503-T to J509-T J503-U to J509-U J503-K to J509-K			
30	Set INSTALLATION switch to OTHER.			
31	Measure resistance between J503-S and J509-L.	0 ohms.	Go to step 32.	Repair faulty circuit.
32	Measure resistance between J503-S and J504-F.	Infinity.	Go to step 33.	Repair faulty. circuit.
33	Measure resistance between J503-S and J505-F.	Infinity.	Go to step 34.	Repair faulty circuit.
34	Set RADIO TRANS switch to CDR ONLY.			
35	Measure resistance between J503-S and J504-F.	0 ohms.	Go to step 36.	Repair faulty circuit.
36	Measure resistance between J503-S and J505-F.	Infinity.	Go to step 37.	Repair faulty circuit.
37	Set RADIO TRANS switch to CDR & CREW.			
38	Measure resistance between J503-S and J504-F.	0 ohms.	Go to step 39.	Replace S502.
39	Measure resistance between J503-S and J505-F.	0 ohms.	Go to step 40.	Repair faulty. circuit.
40	Disconnect test equipment and return AM-1780/VRC to operational condition.			

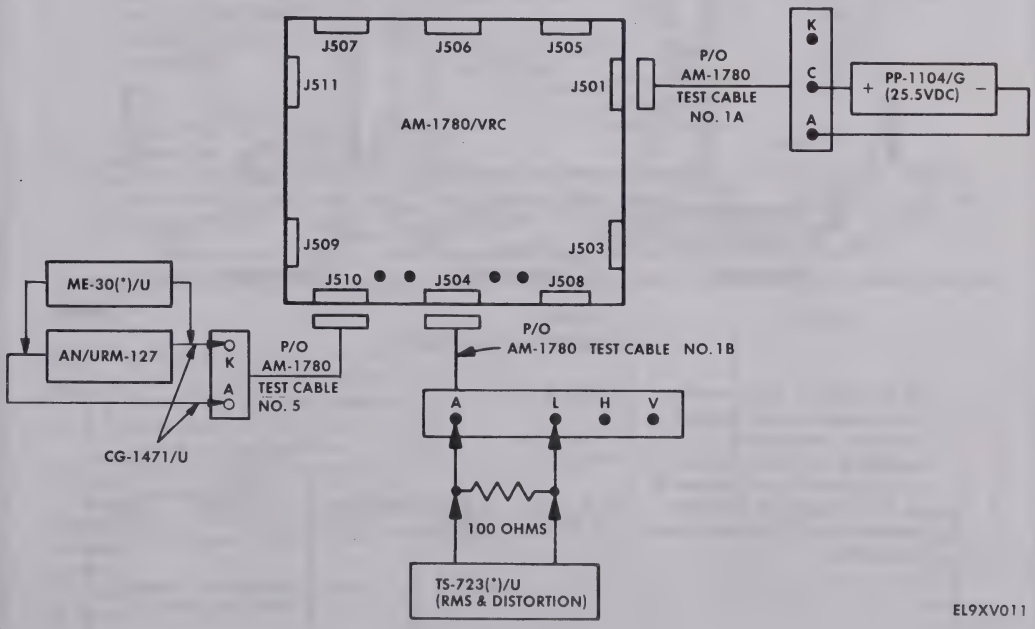
(3) Receiver B Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 5 to J510.			
2	Connect test cable 1A to J501.			
3	Turn off and connect PP-1104/G positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			

c. *Troubleshooting Actions* - Continued

(3) Receiver B Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
4	Turn on PP-1104/G and adjust output to +25.5 V.			
5	Set AM-1780/VRC switches as follows: MAIN PWR: ON INSTALLATION: OTHER POWER CKT BKR: ON	POWER indicator should light.	Go to step 6.	Refer to 2-5c(11)
6	Connect the output of AN/URM-127 to pins K and A of test cable 5.	Test Equipment Required Power Supply PP-1104/G Multimeter TS-352B/U Electronic Voltmeter ME-30/U Spectrum Analyzer TS-723(*)/U Signal Generator AN/URM-127 Cable Assembly CG-1471/U 100 ohm resistor 600 ohm resistor Test cables 1A and 1B (fabrication instructions in appendix C) Test cable 4 (fabrication instructions in appendix C) Test cable 5 (fabrication instructions in appendix C)		
7	Adjust AN/URM-127 output to 1 kHz.			
8	Connect test cable 1B to J504.			
9	Connect 100 ohm resistor across terminals L and A of test cable 1B.			
10	Connect TS-723(*)/U, adjusted to measure voltage, across the resistor.			



Test Setup, Receiver B Circuits

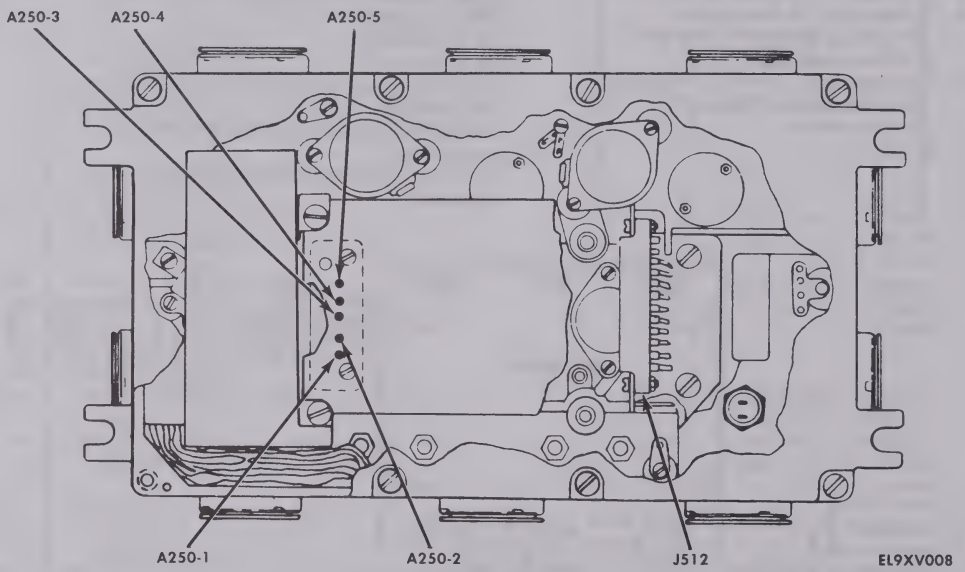
c. *Troubleshooting Actions* - Continued

(3) Receiver B Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
		NOTE		
11	Connect ME-30(*)/U to output of AN/URM-127.	**The ME-30(*)/U is used to measure the output level of AN/URM-127.**		
12	Adjust output level of AN/URM-127 to obtain between 11 and 13 Vac on TS-723(*)/U.	Between 0.170 and 0.276 Vac read on ME-30(*)/U.	Go to step 23.	Go to step 13.

NOTE

For AM-1780/VRC provided with variable gain assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.

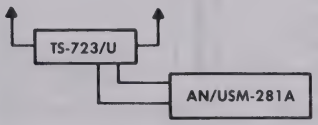


AM-1780/VRC Test Point Locations

13	Use TS-352B/U and measure dc voltage between A250-2 (ground) and A250-4.	+25.5 V.	Go to step 15.	Go to step 14.
14	Measure dc voltage between J512-A and J512-E (ground).	+25.5 V.	Replace A520.	Go to 2-5c(11)
15	Use AN/USM-281A. Observe waveform at J512-6 and note amplitude.	(1 kHz signal from AN/URM-127.)	Go to step 16.	Repair circuit between J501-K and J512-6.

c. *Troubleshooting Actions* - Continued

(3) Receiver B Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
16	Observe waveform at J512-K.	Amplitude 1 kHz signal. (Reference step 15.)	Repair circuit between J512-K and J504-L.	Go to step 17.
17	Observe waveform at A250-5.	Attenuated 1 kHz signal. (Reference step 15.)	Go to step 20.	Go to step 18.
18	Observe waveform at J512-F.	Attenuated 1 kHz signal. (Reference step 15.)	Replace A520.	Go to step 19.
19	Observe waveform at J512-1.	Attenuated 1 kHz signal. (Reference step 15.)	Repair circuit between J512-1 and J512-F (INT ACCENT).	Replace A520.
20	Observe waveform at A520-1 and note amplitude.	Amplified 1 kHz signal.	Go to step 21.	Replace A250.
21	Observe waveform at J512-B.	Same as step 20.	Go to step 22.	Replace A520.
22	Observe waveform at J512-J.	1 kHz signal, greater amplitude than step 20.	Replace A520.	Replace A4.
23	Connect AN/URM-281A to TS-723/U OSCILLOSCOPE terminals.	 EL9XV009		
24	Adjust TS-723/U to measure distortion.			
25	Connect TS-723/U AF INPUT leads to terminals L and A of test cable 1B.	Less than 10% distortion and undistorted sine wave on AN/USM-281.	Go to step 26.	Replace A250.

NOTE

For AM-1780/VRC's with fixed gain audio amplifier A250B, distortion will normally be less than 1%.

26	Turn off power, disconnect PP-1104/G, AN/URM-127, TS-723/U, and 100 ohm resistor.			
27	Set all AM-1780/VRC switches to full counterclockwise.			
28	Set TS-352B/U to measure resistance RX1.			
29	Measure resistance between J510-H and J504-B.	0 ohms.	Go to step 30.	Repair faulty circuit.
30	Measure resistance between J510-H and J505-B.	0 ohms.	Go to step 31.	Repair faulty circuit.

c. *Troubleshooting Actions* - Continued

(3) Receiver B Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
31	Measure resistance between J510-A and ground.	0 ohms.	Go to step 32.	Repair faulty circuit.
32	Disconnect test equipment and return AM-1780/VRC to operational condition.			

(4) Receiver C Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Set INSTALLATION switch to INT ONLY.			
2	Set MAIN PWR switch to INT ONLY.			
3	Set TS-352B/U to measure resistance RX1.			
4	Make continuity readings between the following points: J508-C and J503-K J508-C and J509-K J508-D and J505-J J508-D and J503-H J508-A and ground J508-B and J501-B	0 ohms.	If continuity is not obtained, repair faulty circuit.	
5	Measure resistance between J508-B and ground.	Between 75 and 250 ohms.	Go to step 6.	Refer to 2-5*c*(11).
6	Disconnect test equipment and return AM-1780/VRC to operational condition.			

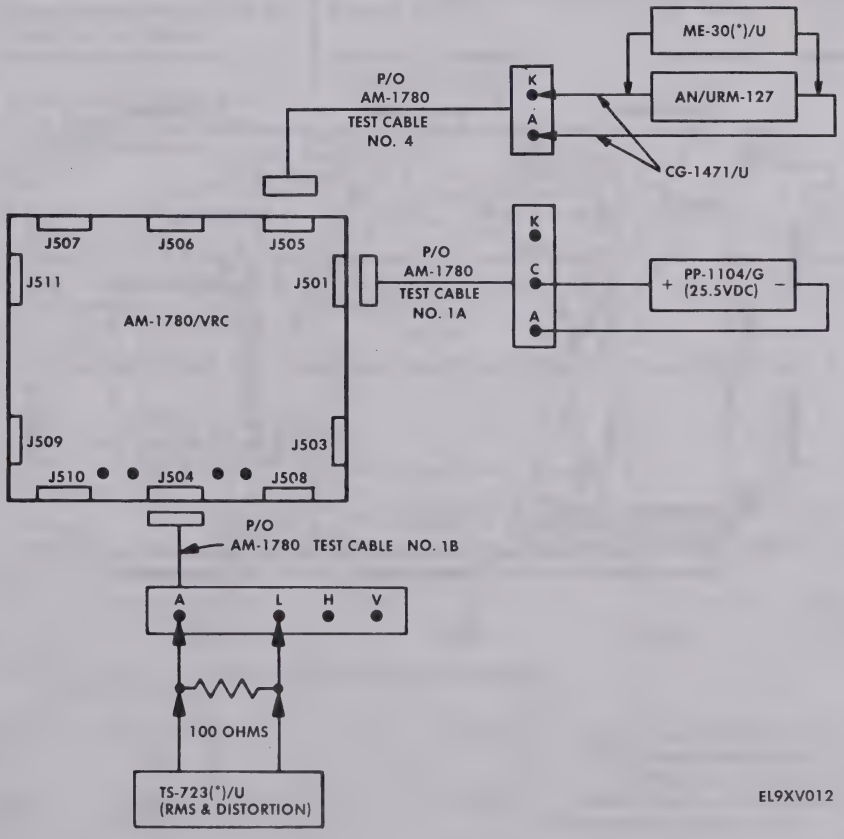
(5) Crew Member Intercom Circuits (All, A and B of control box MONITOR switch)

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 4 to J505.			
2	Connect test cable 1A to J501.			
3	Turn off and connect PP-1104/G positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			
4	Turn on PP-1104/G and adjust output to +25.5 V.			
5	Set AM-1780/VRC MAIN PWR switch to NORM.			

c. *Troubleshooting Actions* - Continued

(5) Crew Member Intercom Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
6	Set INSTALLATION switch to OTHER.			
7	Set POWER CKT BKR to ON.	POWER indicator should light.	Go to step 8.	Go to 2-5*c*(11).
8	Connect output of AN/URM-127 to pins K and A of test cable 4.	Test Equipment Required		
9	Adjust AN/URM-127 output to 1 kHz.	Power Supply PP-1104/G Multimeter TS-352B/U Electronic Voltmeter ME-30/U Spectrum Analyzer TS-723(*)/U Signal Generator AN/URM-127 Cable Assembly CG-1471/U 100 ohm resistor Test cables 1A and 1B (fabrication instructions in appendix C) Test cable 4 (fabrication instructions in appendix C)		
10	Connect test cable 1B to J504.			
11	Connect 100 ohm resistor across terminals L and A of test cable 1B.			
12	Connect TS-723(*)/U, adjusted to measure voltage, across the resistor.			



Test Setup, Crew Member Intercom Circuits

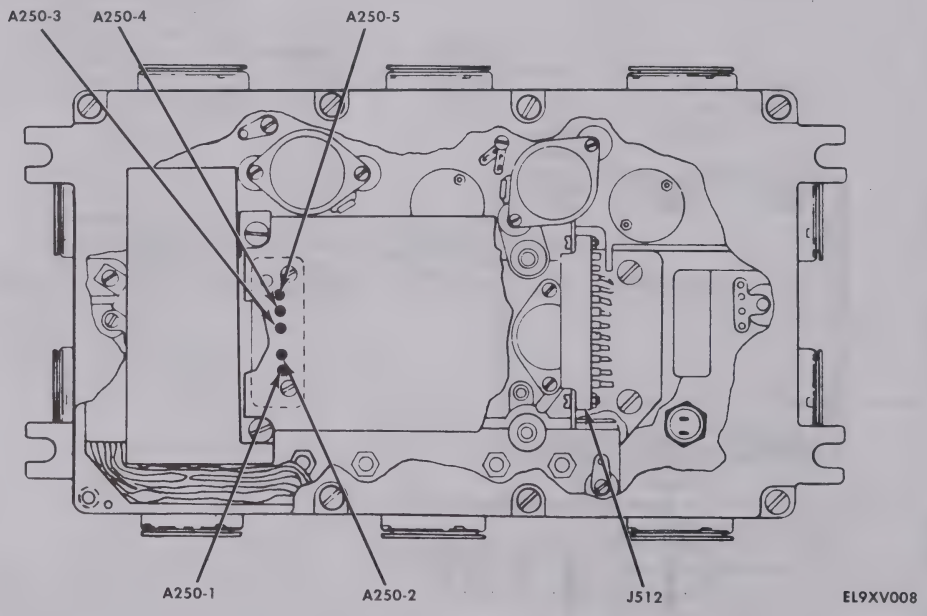
c. *Troubleshooting Actions* - Continued

(5) Crew Member Intercom Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
13	Connect jumper between terminals H and A of test cable 1B.	K501, K502 and K503 energize (relays click).	Go to step 14.	Replace faulty relay.
		NOTE		
14	Connect ME-30(*)/U to output of AN/URM-127.	**The ME-30(*)/U is used to measure the output level of AN/URM-127.**		
15	Adjust the output level of AN/URM-127 to obtain 11 to 13 Vac on TS-723(*)/U.	Between 0.170 and 0.276 Vac read on ME-30(*)/U.	Go to step 24.	Go to step 16.

NOTE

For AM-1780/VRC provided with variable gain assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.

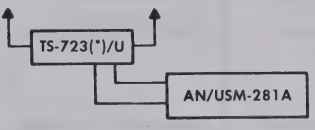


AM-1780/VRC Test Point Locations

16	Use TS-352B/U and measure dc voltage between A250-2 (ground) and A250-4.	+25.5 V.	Go to step 18.	Go to step 17.
17	Measure dc voltage between J512-A and J512-E (ground).	+25.5 V.	Replace A520.	Go to 2-5*c*(11).

c. *Troubleshooting Actions* - Continued

(5) Crew Member Intercom Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
18	Use AN/USM-281A. Observe waveform at J512-C and note amplitude.	(1 kHz signal from AN/URM-127.)	Go to step 19.	Repair circuit between J505-K and J512-C.
19	Observe waveform at J512-K.	Amplified 1 kHz signal. (Reference step 18.)	Repair circuit between J512-K and J505.	Go to step 20.
20	Observe waveform at A250-5.	Attenuated 1 kHz signal. (Reference step 18.)	Go to step 21.	Replace A520.
21	Observe waveform at A250-1 and note amplitude.	Amplified 1 kHz signal.	Go to step 22.	Replace A250.
22	Observe waveform at A520-B and note amplitude.	Same as step 21.	Go to step 23.	Replace A520.
23	Observe waveform at J512-J.	Amplified 1 kHz signal. (Reference step 22.)	Go to step 24.	Replace A4.
24	Connect AN/USM-281A to TS-723(*)/U OSCILLOSCOPE terminals.			
25	Adjust TS-723/U to measure distortion.			
26	Connect TS-723 AF INPUT lead to terminals L and A of test cable 1B.	Less than 10% distortion and undistorted sine wave on AN/USM-281.	Go to step 27.	Replace A250.

NOTE

For AM-1780/VRC's with fixed gain audio amplifier A250, distortion will normally be less than 1%.

27	Disconnect AN/URM-127, TS-723/U, and 100 ohm resistor.			
28	Set TS-352B/U to measure resistance RX1.			

CAUTION

To guard against equipment damage when making measurements with power applied, make sure proper pin is selected and meter probes do not touch together.

29	Measure resistance between terminals E and L of test cable 4.	0 ohms.	Go to step 30.	Repair faulty circuit.
30	Turn off power. Disconnect PP-1104/G and jumper.			

c. *Troubleshooting Actions* - Continued

(5) Crew Member Intercom Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
31	Measure continuity between terminals on test cable 4 and the following points: Terminal A and ground Terminal V and J509-U Terminal J and J503-H Terminal N and E503 (LINE) Terminal U and E504 (LINE) Terminal M and J501-H Terminal B and J510-H Terminal J and J508-D Terminal C and J511-C	0 ohms.	If continuity is not obtained, repair faulty circuit.	
32	Set RADIO TRANS switch to CDR & CREW.			
33	Measure continuity between: Terminal D and J504-D Terminal F and J504-F.	0 ohms.	Go to step 34.	Repair faulty circuit.
34	Measure resistance between terminals C and H.	Less than 200 ohms.	Go to step 35.	Repair faulty K501/502 circuit.
35	Measure resistance between terminal H and J504-H.	Less than 100 ohms.	Go to step 36.	Repair faulty K503 circuit.
36	Measure resistance between terminal C and J504-H.	Between 120 and 180 ohms.	Go to step 37.	Repair faulty circuit.
37	Set INSTALLATION switch to OTHER.			
38	Measure resistance between: Terminal D and J501-S Terminal F and J503-S.	0 ohms.	Go to step 39.	Repair faulty circuit.
39	Disconnect test equipment and return AM-1780/VRC to operational configuration.			

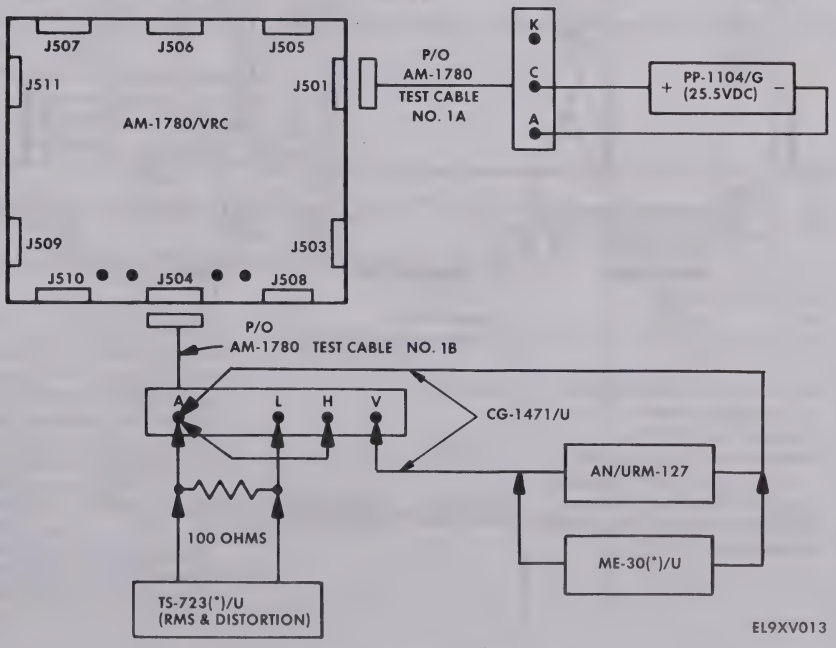
c. *Troubleshooting Actions* - Continued

(6) Commander Intercom Circuits (C position of control box MONITOR switch)

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 1A to J501.			
2	Turn off PP-1104/G and connect positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			
3	Turn on PP-1104/G and adjust output to 25.5 V.			
4	Set AM-1780/VRC switches as indicated: MAIN PWR: NORM INSTALLATION: OTHER POWER CKT BKR: ON	POWER indicator should light.	Go to step 5.	Go to 2-5c(11).
5	Set PWR CKT BKR to OFF.			
6	Connect test cable 1B to J504.			
7	Connect 100 ohm resistor between terminals L and A of test cable 1B.			
8	Connect jumper between terminals H and A of test cable 1B.			
9	Connect AN/URM-127 and ME-30(*)/U to test cable 1B as shown.			

Test Equipment Required

Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Cable Assembly CG-1471/U
100 ohm resistor
Test cables 1A and 1B (fabrication instructions in appendix C)



Test Setup, Commander Intercom Circuits

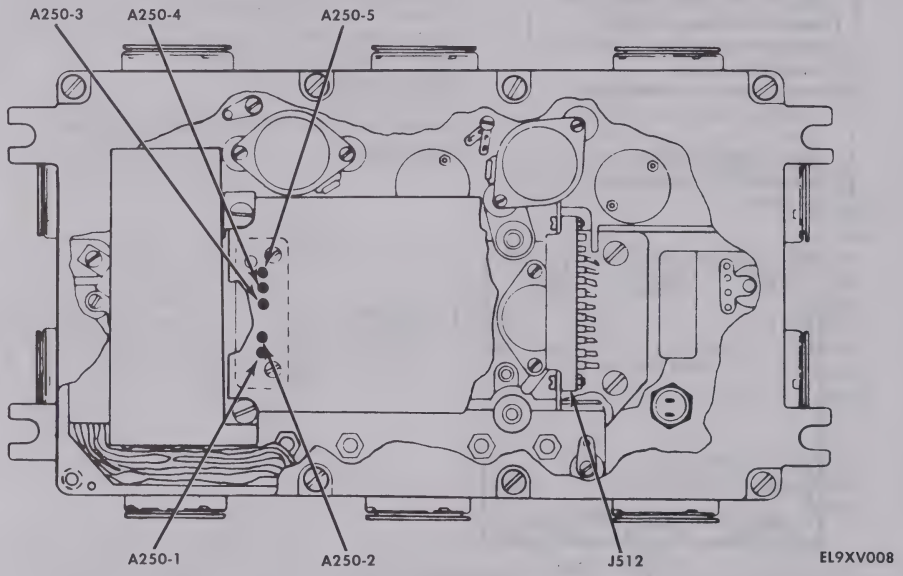
c. *Troubleshooting Actions* - Continued

(6) Commander Intercom Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
10	Connect TS-723(*)/U adjusted to measure voltage across 100 ohm resistor.			
11	Set AM-1780/VRC POWER CKT BKR to ON.	K501, K502, and K503 energize (relays click).	Go to step 12.	Go to 2-5c(10).
12	Adjust AN/URM-127 output to 1 kHz and output level to obtain 11 to 13 Vac on TS-723(*)/U.	Between 0.170 and 0.276 Vac read on ME-30(*)/U.	Go to step 23.	Go to step 13.

NOTE

For AM-1780/VRC provided with variable gain assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.

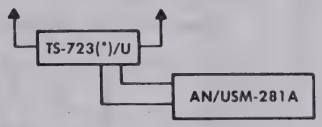


AM-1780/VRC Test Point Locations

13	Use TS-352B/U and measure dc voltage between A250-2 (ground) and A250-4.	+25.5 V.	Go to step 14.	Go to step 15.
14	Measure dc voltage between J512-A and J512-E (ground).	+25.5 V.	Replace A520.	Go to 2-5c(11).
15	Use AN/USM-281A. Observe waveform at J512-C and note amplitude.	(1 kHz signal from AN/ URM-127.)	Go to step 19.	Repair circuit between J505-V and J512-C.

c. *Troubleshooting Actions* - Continued

(6) Commander Intercom Circuits - Continued

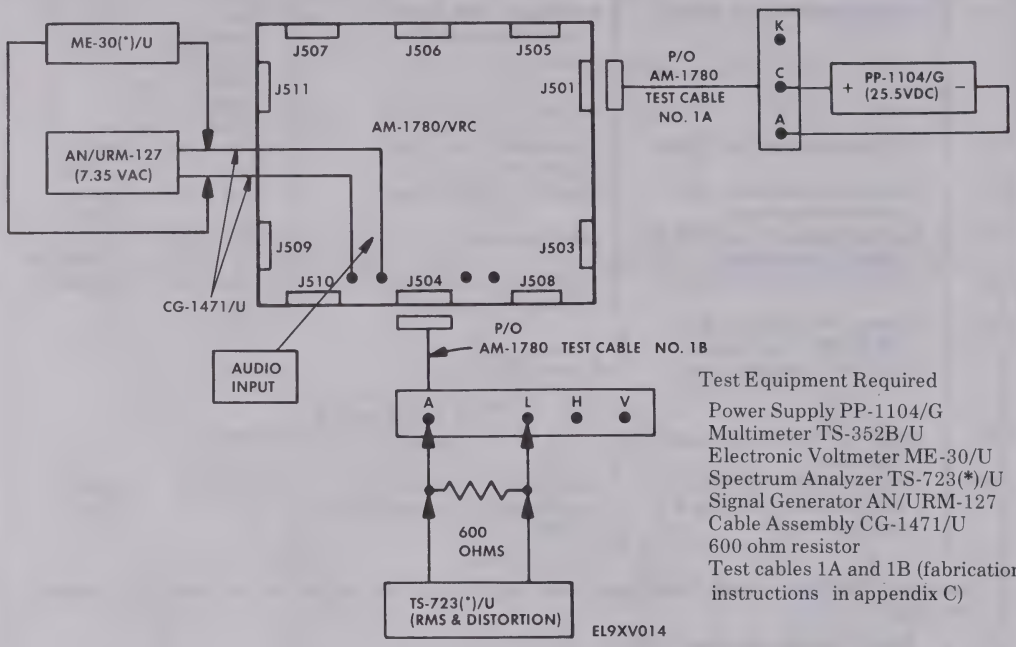
Step	Instruction	Normal Indication	Indication Obtained? Yes	No
16	Observe waveform at J512-K.	Amplified 1 kHz signal. (Reference step 15.)	Repair circuit between J512-K and J505.	Go to step 17.
17	Observe waveform at A250-5.	Attenuated 1 kHz signal. (Reference step 15.)	Go to step 18.	Replace A520.
18	Observe waveform at A250-1 and note amplitude.	Amplified 1 kHz signal.	Go to step 19.	Replace A250.
19	Observe waveform at A520-B and note amplitude.	Same as step 21.	Go to step 20.	Replace A520.
20	Observe waveform at J512-J.	Amplitude 1 kHz signal. (Reference step 22.)	Go to step 21.	Replace A4.
21	Connect AN/USM-281A to TS-723(*)/U OSCILLOSCOPE terminals.			
22	Adjust TS-723/U to measure distortion.			
23	Connect TS-723 AF INPUT lead to terminals L and A of test cable 1B.	Less than 10% distortion and undistorted sine wave on AN/USM-281.	Go to step 25.	Replace A250.
	NOTE **For AM-1780/VRC's with fixed gain audio amplifier A250, distortion will normally be less than 1%.**			
24	Remove power, disconnect test equipment, and return AM-1780/VRC to operational condition.			

(7) AUDIO INPUT Binding Post Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 1A to J501.			
2	Turn off PP-1104/G. Connect positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			
3	Turn on PP-1104/G and adjust output to 25.5 V.			
4	Set AM-1780/VRC switches as indicated: MAIN PWR: NORM INSTALLATION: OTHER POWER CKT BKR: ON	POWER indicator should light.	Go to step 5.	Refer to 2-5*c*(11).

c. *Troubleshooting Actions* - Continued

(7) AUDIO INPUT Binding Post Circuits - Continued



Test Equipment Required

Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Cable Assembly CG-1471/U
600 ohm resistor
Test cables 1A and 1B (fabrication instructions in appendix C)

Test Setup, AUDIO INPUT Binding Post Circuits

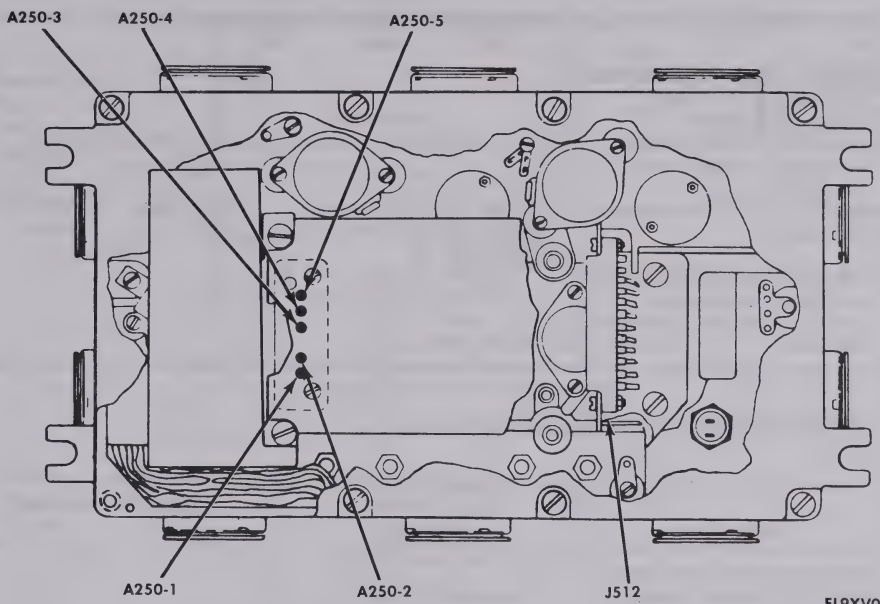
Step	Instruction	Normal Indication	Indication Obtained? Yes	No
		NOTE **The ME-30(*)/U is used to measure the output level of AN/URM-127.**		
5	Connect ME-30(*)/U to output of AN/URM-127.			
6	Connect AN/URM-127 to AUDIO INPUT binding posts.			
7	Connect test cable 1B to J504.			
8	Connect 100 ohm resistor across terminals L and A of test cable 1B.			
9	Connect TS-723(*)/U adjusted to measure voltage across the resistor.			
10	Adjust output of AN/URM-127 to 1 kHz, and output level to 7.35 V.	Between 11 and 13 V on TS-723(*)/U.	Go to step 16.	Go to step 11.

NOTE

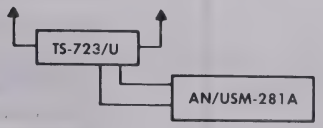
For AM-1780/VRC provided with variable gain assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.

c. *Troubleshooting Actions* - Continued

(7) AUDIO INPUT Binding Post Circuits - Continued



AM-1780/VRC Test Point Locations

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
11	Use TS-352B/U and measure dc voltage between A250-2 (ground) and P250-4.	+25.5 V.	Go to step 13.	Go to step 14.
12	Measure dc voltage between J512-A and J512-E (ground).	+25.5 V.	Replace A520.	Go to 2-5c(11).
13	Use AN/URM-281A. Observe waveform at J512-8 and note amplitude.	(1 kHz signal from AN/URM-127.)	Go to step 14.	Repair circuit between E502 and J512-8.
14	Observe waveform at J512-1.	Attenuated 1 kHz signal. (Reference step 13.)	Go to step 15.	Replace A520.
15	Connect AN/USM-281A to TS-723/U OSCILLOSCOPE terminals.			
16	Adjust TS-723/U to measure distortion.			
17	Connect TS-723/U AUDIO INPUT leads to terminals L and A of test cable 1B.	Less than 10% distortion and undistorted sine wave on AN/USM-281A.	Go to step 18.	Replace A520.

c. *Troubleshooting Actions* - Continued

(7) AUDIO INPUT Binding Post Circuits - Continued

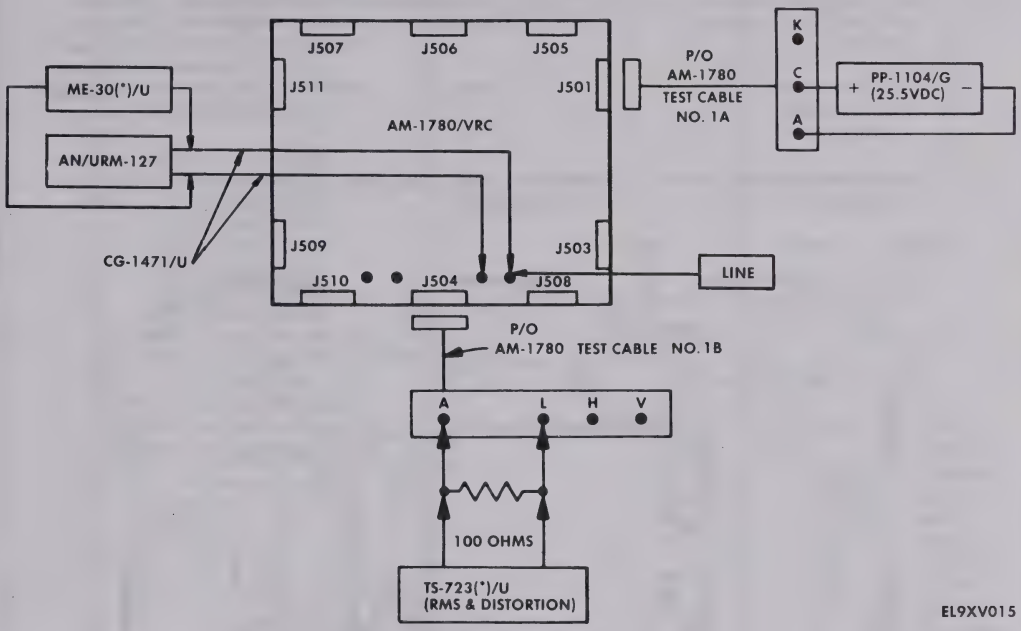
Step	Instruction	Normal Indication	Indication Obtained? Yes	No
	NOTE **For AM-1780/VRC's with fixed gain audio amplifier A250, distortion will normally be less than 1%.**			
18	Disconnect the 100 ohm resistor and connect a 600 ohm resistor in its place.			
19	Connect TS-723(*)/U, adjusted to measure voltage, across the resistor.	No less than 11 V.	Go to step 20.	Replace A250.
20	Adjust TS-723(*)/U to measure distortion.	Less than 10% distortion and undistorted sine wave on AN/USM-281A.	Go to step 21.	Replace A520.
21	Turn off power, disconnect test equipment, and return AM-1780/VRC to operational condition.			

(8) LINE (TEL/REMOTE) Binding Post Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 1A to J501.			
2	Turn off PP-1104/G. Connect positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			
3	Turn on PP-1104/G and adjust output to +25.5 V.			
4	Set AM-1780/VRC switches as indicated: MAIN PWR: NORM INSTALLATION: OTHER POWER CKT BKR: ON	POWER indicator should light.	Go to step 5.	Refer to 2-5c(11).
		Test Equipment Required Power Supply PP-1104/G Multimeter TS-352B/U Electronic Voltmeter ME-30/U Spectrum Analyzer TS-723(*)/U Signal Generator AN/URM-127 Cable Assembly CG-1471/U 100 ohm resistor Test cables 1A and 1B (fabrication instructions in appendix C)		

c. *Troubleshooting Actions* - Continued

(8) LINE (TEL/REMOTE) Binding Post Circuits - Continued



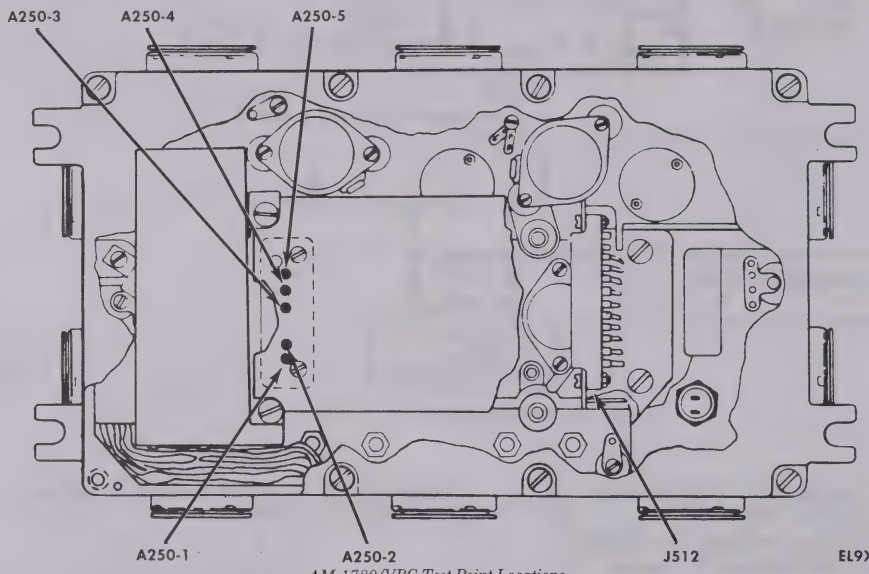
Test Setup, LINE (TEL/REMOTE) Binding Post Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
		NOTE		
		The ME-30(*)/U is used to measure the output level of AN/URM-127.		
5	Connect ME-30(*)/U to output of AN/URM-127.			
6	Connect AN/URM-127 to LINE (TEL/REMOTE) binding posts.			
7	Connect test cable 1B to J504.			
8	Connect 100 ohm resistor across terminals L and A of test cable 1B.			
9	Connect TS-723(*)/U adjusted to measure voltage across the resistor.			
10	Adjust output of AN/URM-127 to 1 kHz, and output level to 0.44 V.	Between 11 and 13 V on TS-723(*)/U.	Go to step 13.	Go to step 11.
		NOTE		
		For AM-1780/VRC provided with variable gain assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.		

c. *Troubleshooting Actions* - Continued

(8) LINE (TEL/REMOTE) Binding Post Circuits - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
11	Use oscilloscope. Observe waveform at J512-D and note amplitude.	(1 kHz signal from AN/URM-127.)	Go to step 12.	Repair faulty circuit between binding posts and J512.
12	Use oscilloscope and observe waveform at A250-5.	Attenuated 1 kHz signal from AN/URM-127.	Go to step 13.	Replace A520.



AM-1780/VRC Test Point Locations

13	Connect jumper between terminals H and A of test cable 1B.	0 V on TS-723(*)/U.	Go to step 14.	Refer to 2-5c(10).
14	Disconnect jumper.			
15	Connect AN/URM-127 to terminals V and A of test cable 1B.			
16	Connect 600 ohm resistor between LINE binding posts.	0 V on TS-723(*)/U.	Go to step 17.	Refer to 2-5c(10).
17	Connect jumper between terminals H and A of test cable 1B.	Between 0.348 and 0.620 Vac.	Go to step 18.	Refer to 2-5c(10).
18	Turn off power, disconnect test equipment, and return AM-1780/VRC to operational condition.			

c. *Troubleshooting Actions* - Continued

(9) Retransmit Circuits

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Set all AM-1780/VRC switches fully counterclockwise.			
2	Set TS-352B/U to measure resistance RX1.			
3	Measure continuity between the following points: J503-S and J509-S J503-T and J509-T J503-U and J509-U J503-K and J509-K J503-A and ground J509-A and ground J501-A and ground J511-A and ground J501-S and J511-S J501-T and J511-T J501-U and J511-U J501-K and J511-K	0 ohms.	If continuity is not obtained, repair the faulty circuit.	
4	Measure resistance between J509-V and ground.	Between 4960 and 7440 ohms.	Go to step 5.	Check wiring between J512-V and J512-2. If bad, repair wiring. If wiring is good, replace A520.
5	Turn off power, disconnect test equipment, and return AM-1780/VRC to operational condition.			

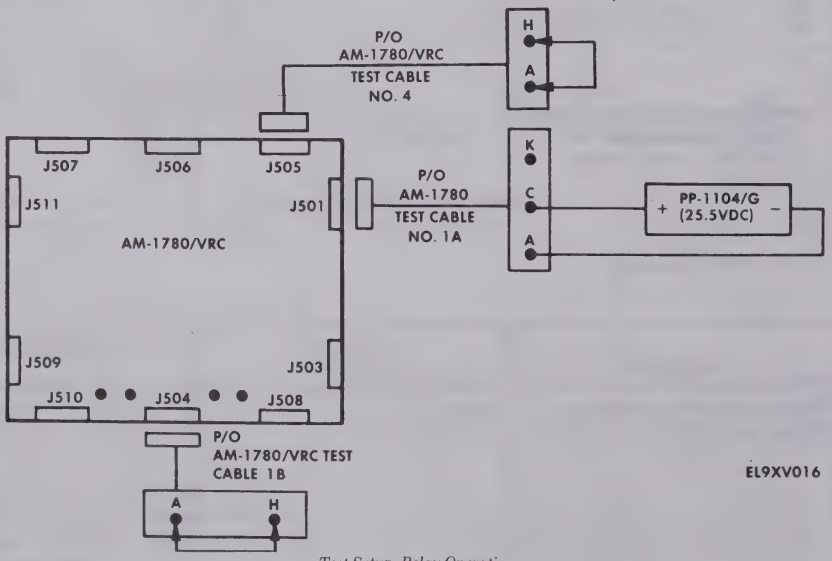
(10) Relay Operation

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Make the following continuity checks:	0 ohms.	Go to step 2.	Check wiring to relay socket. If wiring is good, replace relay.

c. *Troubleshooting Actions* - Continued

(10) Relay Operation - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
	NOTE			
	The relay and relay socket pins being checked are in parentheses following the measurement points.			
	J504-V to J509-U (K503, 8 and 6) J504-J to J504-H (K501, 15 and 16) J504-K to J501-U (K503, 4 and 2) J504-M to J501-H (K501, 9 and 10) J504-B to J510-H (K501, 12 and 13) J505-K to J501-U (K502, 12 and 13)	Test Equipment Required Power Supply PP-1104/G Multimeter TS-352B/U Test cable 4 (fabrication instructions in appendix C)		
2	Measure resistance between J505-H and J505-C (K501 and K502 windings).	Less than 200 ohms.	Go to step 3.	Replace, in turn, K501 and K502.
3	Measure resistance between J505-H and J504-H.	Less than 100 ohms.	Go to step 4.	Replace K503.
4	Connect test cable 1A to J501.			
5	Turn off PP-1104/G. Connect positive lead to terminal C and negative lead to terminal A (ground) of test cable 1A.			



Test Setup, Relay Operation

c. *Troubleshooting Actions* - Continued

(10) Relay Operation - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
6	Turn on PP-1104/G and adjust output to 25.5 V.			
7	Set AM-1780/VRC switches as indicated: MAIN PWR: INT ONLY POWER CKT BKR: ON RADIO TRANS: CDR & CREW INSTALLATION: OTHER	POWER indicator should light.	Go to step 8.	Refer to 2-5c(11).
8	Connect test cable 1B to J504 and test cable 4 to J505.			
9	Connect jumpers between terminals H and A of test cables 1B and test cable 4.			

CAUTION

To guard against equipment damage when making measurements with power applied, make sure proper pin is selected and meter probes do not touch together.

10	Make the following resistance measurements to check K503:		Go to step 11.	If any check is incorrect, replace K503.
	J504-K to J504-V	0 ohms.		
	J504-K to J501-U	Greater than 1 megohm.		
	J504-V to J505-V	Greater than 1 megohm.		
11	Make the following resistance measurements to check K502:		Go to step 12.	If any check is incorrect, replace K502.
	J505-K to J501-U	Greater than 1 megohm.		
	J505-K to ground	Between 120 and 180 ohms.		
	E503 to E504	Less than 25 ohms.		
	J505-V to J504-K	0 ohms.		
12	Make the following resistance measurements to check K501:		Go to step 13.	If any check is incorrect, replace K501.
	J505-D to J504-D	Greater than 1 megohm.		
	J505-J to J504-J	Greater than 1 megohm.		
	J505-B to J510-H	Greater than 1 megohm.		
	J505-M to J501-H	Greater than 1 megohm.		
	J505-L to J505-E	0 ohms.		
	J505-L to J504-J	0 ohms.		
	J505-B to J505-L	0 ohms.		
	J505-M to J505-L	0 ohms.		
13	Remove power, disconnect test equipment, and return AM-1780/VRC to operational condition.			

c. *Troubleshooting Actions* - Continued

(11) Power Distribution

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Set all AM-1780/VRC switches fully counterclockwise, PWR CKT BKR to OFF.			
2	Use TS-352B/U and measure resistance between J501A and ground.	0 ohms.	Go to step 3.	Repair faulty circuit.
3	Measure resistance between J501, pin B, then pin C to ground.	Infinity.	Go to step 4.	Repair faulty circuit.
4	Set INSTALLATION switch to INT ONLY.			
5	Measure resistance between J508-C and ground.	Infinity.	Go to step 6.	Repair faulty circuit.
6	Measure continuity between J508-B and J501-B.	0 ohms.	Go to step 7.	Repair faulty circuit.
7	Measure continuity between the following points (test cables may be used to facilitate connections): J505-C and J506-C J505-C and J507-C J505-C and J504-C J505-C and J511-C	0 ohms.	Go to step 8.	Repair faulty circuit.
8	Measure resistance between J505-H and J505-C.	Less than 200 ohms.	Go to step 9.	Repair faulty K502/K503 winding circuit.
9	Set POWER CKT BKR to ON.			
	NOTE **The resistance indication in steps 10 through 14 were obtained using Multimeter TS-352B/U set to RX1 scale. If any other range, or a different multimeter, is used, the resistance indications may be different since transistors are in the circuit.**			
10	Measure resistance between J501-B and ground, then reverse leads and repeat measurement.	Between 100 and 150 ohms, and between 28 and 42 ohms with leads reversed.	Go to step 14.	Go to step 11.
11	Check front to back resistance ratio of Q501 and Q502 as follows: E to B C to B E to C	 Approximately 500 to 1. Approximately 500 to 1. Approximately equal.	 Go to step 12.	 Replace electrical assembly A4.
12	Check front to back resistance ratio of CR501.	Approximately 500 to 1.	Go to step 13.	Replace electrical assembly A4.

c. *Troubleshooting Actions* - Continued

(11) Power Distribution - Continued

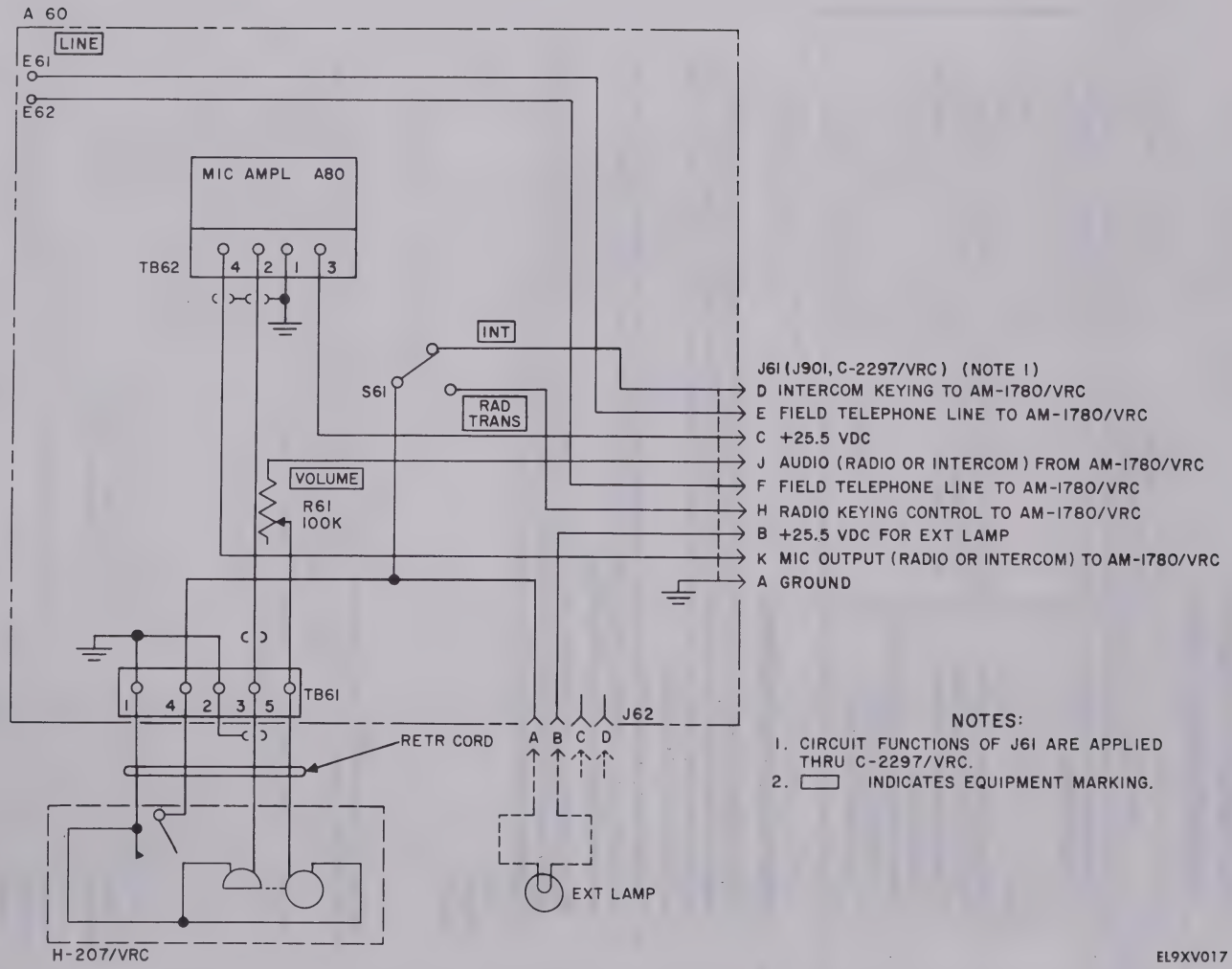
Step	Instruction	Normal Indication	Indication Obtained? Yes	No
13	Check front to back resistance ratio of CR502.	Approximately 500 to 1.	Go to step 14.	Replace suppressor assembly A8.
14	Measure resistance between J504-C and ground, then reverse leads and repeat measurement.	Between 100 and 150 ohms, and between 36 and 54 with leads reversed.	Go to step 15.	Replace filter assembly A5.
15	Disconnect test equipment and return AM-1780/VRC to operational condition.			

2-6. C-2296/VRC TROUBLESHOOTING

a. *Fault Verification.* Fault verification for the C-2296/VRC consists of checking the C-2296/VRC to make sure that the problem reported by organizational maintenance exists. This is done by performing the operational check in 2-14. Also, you must perform the operational check to make sure that you have solved the problem.

b. *Troubleshooting Actions.* The following paragraphs provide tabular instructions to guide direct support maintenance personnel in fault isolation of the C-2296/VRC. Refer to the C-2296/VRC schematic diagram while troubleshooting.

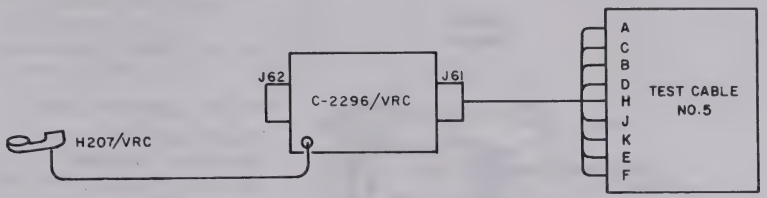
Before beginning to troubleshoot, remove the back cover from the C-2296/VRC by loosening four captive screws. When finished troubleshooting, apply a light coating of insulating silicone compound to preformed packing, replace back cover and tighten four captive screws.



C-2296/VRC, Schematic Diagram

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cable 5 as shown.			



C-2296/VRC, Test Setup

EL9XV018

2	Set the VOLUME control on the C-2296/VRC fully clockwise.			
3	Set TS-352B/U to measure resistance RX1.			
4	Make continuity readings between the terminals of the test cable and jack as indicated below: J61-A to ground J61-B to J62-B J61-D to J62-A	0 ohms.	If continuity is not obtained, repair the faulty circuit.	
5	Set INT-RAD TRANS switch to RAD TRANS and check continuity from J61-H to J62-A.	0 ohms.	Go to step 6.	Repair faulty circuit.
6	Connect a jumper between E61 and E62 (LINE binding posts) and check continuity between J61-E and J61-F.	0 ohms.	Go to step 7.	Repair faulty circuit.
7	Remove jumper.			
8	Press handset switch on H-207/VRC and check continuity between J61-D and J61-A.	Less than 15 ohms.	Go to step 9.	Repair faulty circuit.
9	Set TS-352B/U to RX1000 and check for adverse shorts as indicated below: J61-B to J61-A J61-D to J61-A J61-E to J61-A J61-F to J61-A J61-H to J61-A	Greater than 10 ohms.	If adverse short is found, repair faulty circuit.	
10	Connect TS-352B/U between J61-J and J61-A.			
11	Rotate VOLUME control throughout its range.	From between 0 and 35 ohms to between 9 and 11 ohms smoothly.	Go to step 12.	Repair R61 circuit.

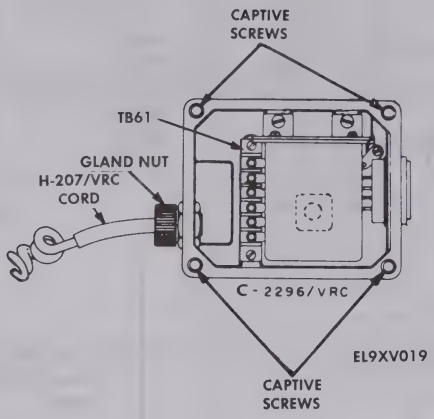
NOTE

In some units R61 is 100 k and terminal L is not connected: normal indication for step 11 is from between 0 and 35 ohms to between 90 and 110 k ohms.

12	Locate TB61.			

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No

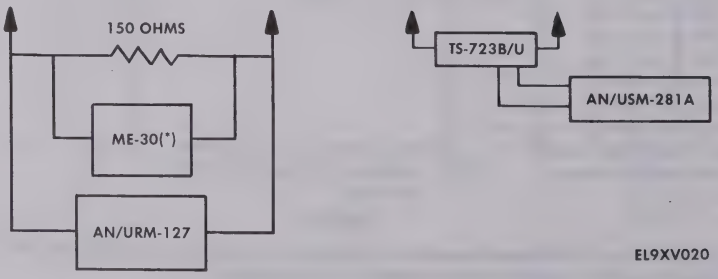


C-2296/VRC, Back Cover Removed

Test Equipment Required

Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Oscilloscope AN/USM-282
150 ohm resistor
Test cable 5 (fabrication instructions in appendix C)

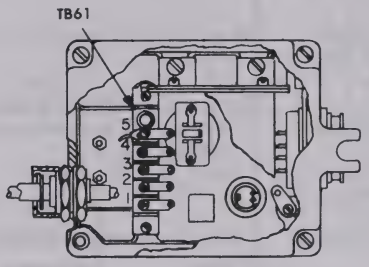
13	Connect a 150 ohm resistor to terminals K and A of test cable 5.			
14	Turn off PP-1104/G and connect the positive lead to terminal C and the negative lead to A (ground) of test cable 5.			
15	Connect a 150 ohm resistor to the output of AN/URM-127. Use the ME-30(*)/U, connected across the resistor, to measure the output signal level of the AN/URM-127.			



Test Equipment Setup

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
16	Connect AN/USM-281A to the TS-723B/U OSCILLOSCOPE terminals.			
17	Connect AN/URM-127 to terminal 3 of TB61.			



C-2296/VRC, TB-61 Location EL9XV021

18	Turn on and adjust output of PP-1104/G to 22 Vdc.			
19	Turn on and adjust output of AN/URM-127 to 500 Hz. Set output signal level to 0.007 V as read on ME-30(*)/U.			
20	Connect TS-723B/U METER leads to terminals K and A (ground) of test cable 5.	Between 0.174 and 0.277 Vac.	Go to step 21.	Replace A80.
21	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 5. Measure distortion.	Less than 2% distortion and undistorted sine wave on AN/USM-281.	Go to step 22.	Replace A80.
22	Adjust output of AN/URM-127 to 1000 Hz at 0.007 V.			
23	Connect TS-723B/U METER leads to terminals K and A of test cable 5.	Between 0.174 and 0.277 Vac.	Go to step 24.	Replace A80.
24	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 5.	Less than 2% distortion and undistorted sine wave on AN/USM-281.	Go to step 25.	Replace A80.
25	Adjust output of AN/URM-127 to 3000 Hz at 0.007 V.			
26	Connect TS-723B/U METER leads to terminals K and A of test cable 5.	Between 0.174 and 0.277 Vac.	Go to step 27.	Replace A80.
27	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 5.	Less than 2% distortion and undistorted sine wave on AN/USM-281.	Go to step 28.	Replace A80.
28	Adjust output of PP-1104/G to 25.5 V.			

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
29	Connect TS-723B/U METER leads to terminals K and A of test cable 5.	Between 0.174 and 0.277 Vac.	Go to step 30.	Replace A80.
30	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 5.	Less than 2% distortion and undistorted sine wave on AN/USM-281.	Go to step 31.	Replace A80.
31	Adjust output of PP-1104/G to 30.0 V.			
32	Connect TS-723B/U METER leads to terminals K and A of test cable 5.	Between 0.174 and 0.277 Vac.	Go to step 33.	Replace A80.
33	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 5.	Less than 2% distortion and undistorted sine wave on AN/USM-281.	Go to step 34.	Replace A80.
34	Remove AN/URM-127 from terminal 3 and connect it to terminal 5 of TB61.			
35	Listen for tone in H-207/VRC earpiece.	3000 Hz tone of AN/URM-127.	Go to step 36.	Replace H-207/VRC.
36	Turn off and disconnect AN/URM-127.			
37	Connect TS-723B/U METER leads to terminals K and A of test cable 5.			
38	Press push-to-talk switch on H-207/VRC and talk into mouthpiece; observe indication on TS-723B/U.	0.004 V or greater.	Go to step 39.	Replace H-207/VRC.
39	Remove power, disconnect test equipment, and return C-2296/VRC to operational condition.			

2-7. C-2297/VRC TROUBLESHOOTING

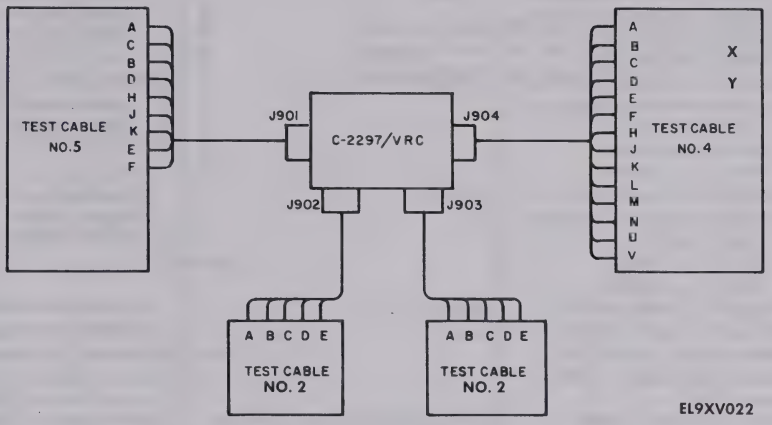
a. Fault Verification. Fault verification for the C-2297/VRC consists of checking the C-2297/VRC to make sure that the problem reported by organizational maintenance exists. This is done by performing the operational check in 2-15. Also, you must perform the operational check to make sure that you have solved the problem.

b. Troubleshooting Actions. The following paragraphs provide tabular instructions to guide direct support maintenance personnel in fault isolation of the C-2297/VRC. Refer to FO-7, C-2297/VRC schematic diagram while troubleshooting.

Before beginning to troubleshoot, remove the back cover from the C-2297/VRC by loosening four captive screws. When finished troubleshooting, apply a light coating of insulating silicone compound to preformed packing, replace back cover and tighten four captive screws.

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect the test cables as shown.			



C-2297/VRC, Test Setup

2	Set the TS-352B/U to measure resistance (RX1).		
3	Set the volume control on the C-2297/VRC fully clockwise.		
4	Make continuity readings between the terminals of test cables connected to the jacks as indicated below: J903-B to J902-B J903-B to J903-E J903-B to J902-E.	0 ohms.	If continuity is not obtained, repair the faulty circuit.
5	Set MONITOR switch to INT ONLY and SIG-EXT-OFF switch to EXT. Continue with continuity checks. J902-C to J904-D J903-C to J904-H J901-C to J904-C J901-D to J904-H J901-E to J904-N J901-F to J904-U J901-J to J904-E J901-K to J904-K J902-C to J903-C	0 ohms.	If continuity is not obtained, repair the faulty circuit.

Test Equipment Required

Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Oscilloscope AN/USM-281A
150 ohm resistor
Test cable 2 (fabrication instructions in appendix C)
Test cable 4 (fabrication instructions in appendix C)
Test cable 5 (fabrication instructions in appendix C)

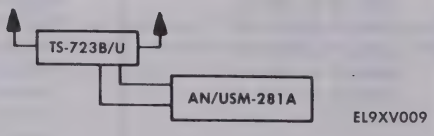
b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
6	Set MONITOR switch to ALL and continue continuity checks: J901-J to J904-L J901-K to J904-K	0 ohms.	If continuity is not obtained, repair faulty circuit.	
7	Set MONITOR switch to A and continue continuity checks: J901-J to J904-M J901-K to J904-K	0 ohms.	If continuity is not obtained, repair faulty circuit.	
8	Set MONITOR switch to B and continue continuity checks: J901-H to J904-D J901-J to J904-B J901-K to J904-K	0 ohms.	If continuity is not obtained, repair faulty circuit.	
9	Set MONITOR switch to C and continue continuity checks: J901-J to J904-J J901-K to J904-V J901-C to J904-F.	0 ohms.	If continuity is not obtained, repair faulty circuit.	
10	Set SIG-EXT-OFF switch to SIG and measure continuity from J901-D to J901-A.	0 ohms.	If continuity is not obtained, repair faulty circuit.	
11	Connect TS-352B/U to J904-L and J902-B.			
12	Rotate VOLUME control throughout its range.	From between 9 and 11 kohms to between 0 and 35 ohms smoothly.	Go to step 13.	Repair/ replace VOLUME control R801.

NOTE

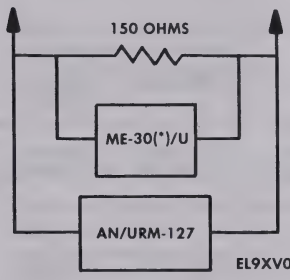
In some units R801 may be 100 k: normal indication in step 12 is from between 90 and 110 kohms to between 0 and 35 ohms. Step 14 should indicate infinity. (R801 terminal L is not connected.)

13	Connect TS-352B/U to J902-E and J902A.			
14	Rotate VOLUME control throughout its range.	From between 9 and 11 kohms to between 0 and 35 ohms.	Go to step 15.	Attach terminal L of R801 to ground.
15	Connect a 150 ohm resistor to terminals K and A of test cable 4.			
16	Connect AN/USM-281A to the TS-723B/U OSCILLOSCOPE terminals.			



b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
17	Connect a 150 ohm resistor to the output of the AN/URM-127, and ME-30(*)/U across the resistor as shown.			



NOTE

Use the ME-30(*)/U to measure the output signal level of the AN/URM-127 in the remainder of the procedures.

18	Connect the AN/URM-127 to terminals D and A (ground) of test cable 2 attached to J802. Adjust the output frequency to 1000 Hz.			
19	Adjust the AN/URM-127 output signal level to 0.007 V as read on the ME-30(*)/U.			
20	Turn off PP-1104/G. Connect the positive lead to terminal C and the negative lead to terminal A of test cable 4.			
21	Set the SIG-EXT-OFF switch to OFF.			
22	Set the MONITOR switch to ALL.			
23	Turn on PP-1104/G and adjust output to 22 Vdc.			
24	Connect AN/URM-127 to terminals D and A of test cable 2 connected to J902.			
25	Adjust output of AN/URM-127 to 500 Hz and output signal level to 0.007 V as measured on the ME-30(*)/U.			
26	Connect TS-723B/U METER leads to terminals K and A of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 26.	Replace A80.
27	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 28.	Replace A80.
28	Adjust AN/URM-127 output to 1000 Hz at 0.007 V.			

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
29	Connect TS-723B/U METER leads to terminals K and A of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 30.	Replace A80.
30	Connect TS-723B/U AF INPUT leads to terminals K A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 31.	Replace A80.
31	Adjust AN/URM-127 output to 3000 Hz at 0.007 V.			
32	Connect TS-723B/U METER leads to terminals K and A of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 33.	Replace A80.
33	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 34.	Replace A80.
34	Set the PP-1104/G to 25.5 Vdc.			
35	Connect the TS-723B/U METER leads to terminals K and A of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 36.	Replace A80.
36	Connect the TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 37.	Replace A80.
37	Set the PP-1104/G to 30 Vdc.			
38	Connect the TS-723B/U METER leads to terminals K and A on test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 39.	Replace A80.
39	Connect the TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 40.	Replace A80.
40	Remove the AN/URM-127 (with ME-30(*)/U and resistor) from J802 and connect it to terminals D and A of test cable on J803.			
41	Connect the TS-723B/U METER leads to terminals K and A of test cable 4, record the reading for use in step 42 to 45.	Between 0.174 and 0.277 Vac.	Go to step 42.	Replace A80.
42	Connect TS-723B/U METER leads to terminals K and A of test cable 4. Rotate MONITOR switch to A, INT ONLY and B.	Same as step 41 in each position.	Go to step 43.	Replace or repair faulty S901 circuit.
43	Set MONITOR switch to C.			
44	Change 150 ohm resistor connection from terminal K to terminal V of test cable 4.			

b. Troubleshooting Actions - Continued

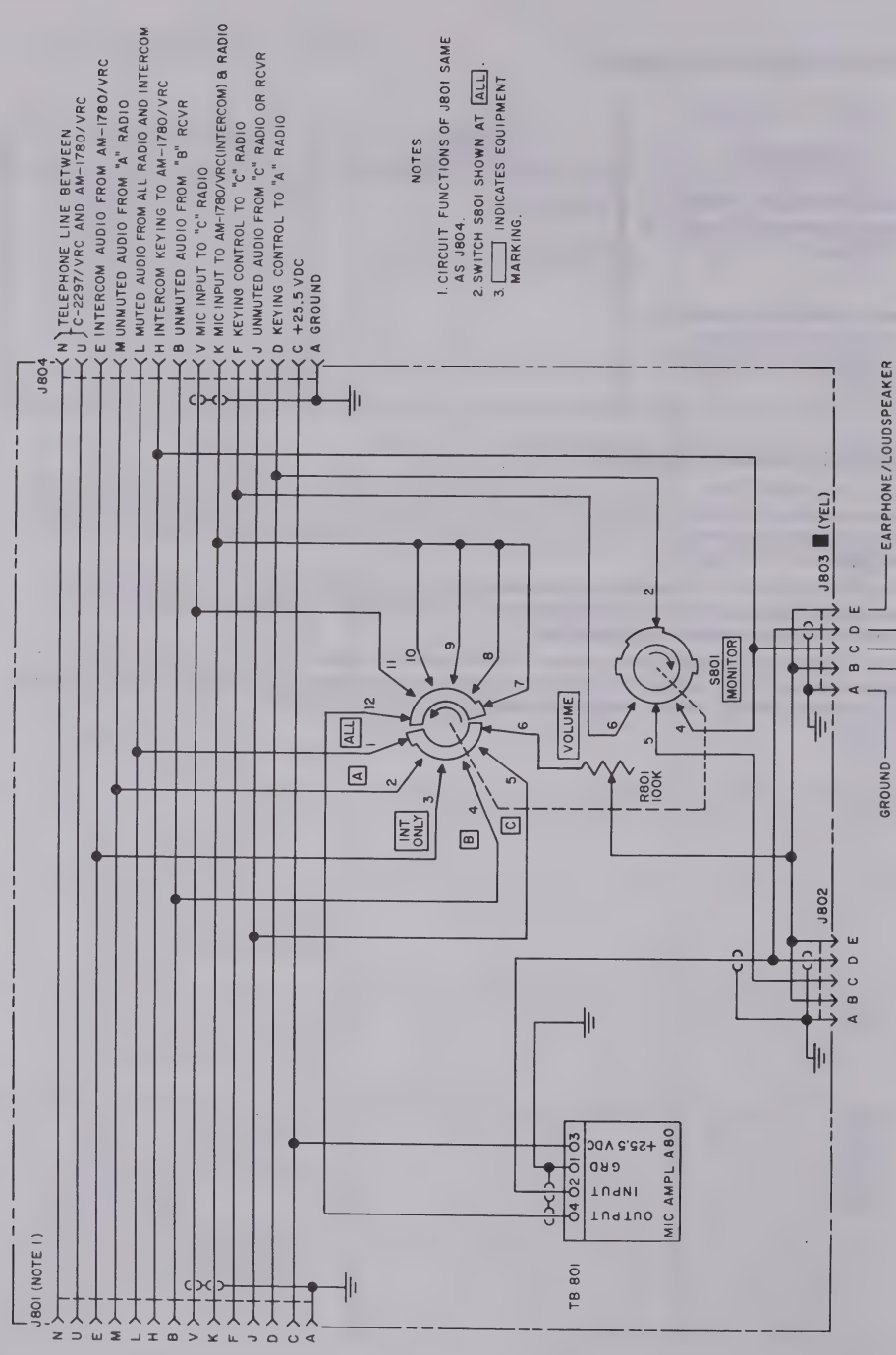
Step	Instruction	Normal Indication	Indication Obtained? Yes	No
45	Connect TS-723B/U METER leads to terminals K and A of test cable 4.	Same as step 41.	Go to step 46.	Replace or repair faulty S901 circuit.
46	Remove power, disconnect test equipment, and return C-2297/VRC to operational condition.			

2-8. C-2298/VRC TROUBLESHOOTING

a. Fault Verification. Fault verification for the C-2298/VRC consists of checking the C-2298/VRC to make sure that the problem reported by organizational maintenance exists. This is done by performing the operational check in 2-16. Also, you must perform the operational check to make sure that you have solved the problem.

b. Troubleshooting Actions. The following paragraphs provide tabular instructions to guide direct support maintenance personnel in fault isolation of the C-2298/VRC. Refer to the C-2298/VRC schematic diagram while troubleshooting.

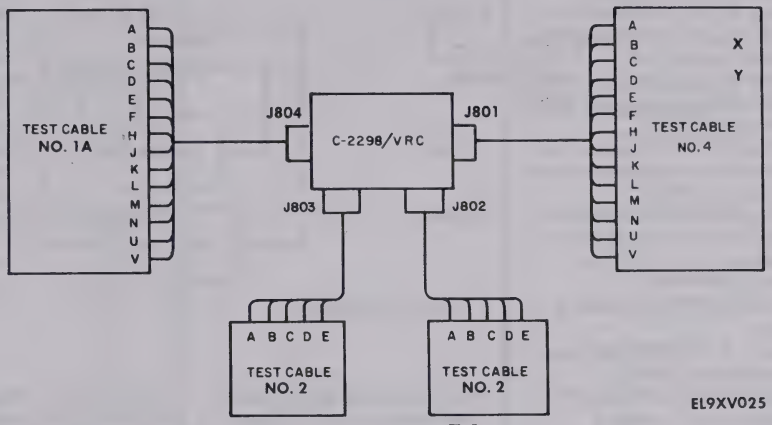
Before beginning to troubleshoot, remove the back cover from the C-2298/VRC by loosening four captive screws. When finished troubleshooting, apply a light coating of insulating silicone compound to preformed packing, replace back cover and tighten four captive screws.



C-2298/VRC, Schematic Diagram

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect test cables as shown.			


TEST CABLE NO. 1A
A B C D E F H J K L M N U V
J804
C-2298/VRC
J801
J803
J802
A B C D E F H J K L M N U V X Y
TEST CABLE NO. 4
A B C D E
TEST CABLE NO. 2
A B C D E
TEST CABLE NO. 2
EL9XV025

C-2298/VRC, Test Setup

2	Set TS-352B/U to measure ohms RX1.		
3	Set the VOLUME control on the C-2298/VRC fully clockwise.		
4	Make continuity reading between the terminals of test cables connected to the jacks as indicated below: J801-A to J804-A J801-B to J804-B J801-C to J804-C J801-D to J804-D J801-E to J804-E J801-F to J804-F J801-H to J804-H J801-J to J804-J J801-K to J804-K J801-L to J804-L J801-M to J804-M J801-N to J804-N J801-U to J804-U J801-V to J804-V J802-A to J803-A J802-B to J803-B J802-D to J803-D J802-E to J803-E J802-B to J803-E J803-B to J803-E J802-C to J804-D	0 ohms.	If continuity is not obtained, repair the faulty circuit.

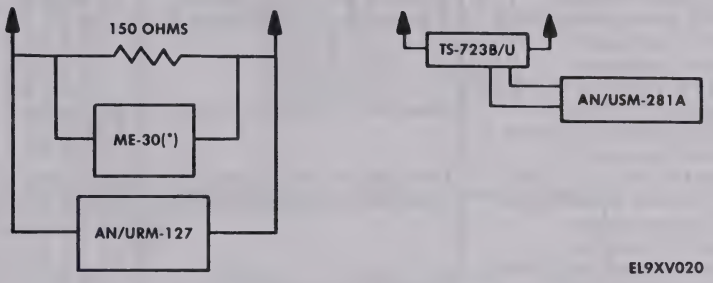
Test Equipment Required

Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Oscilloscope AN/USM-281A
150 ohm resistor
Test cable 1A (fabrication instructions in appendix C)
Test cable 2 (fabrication instructions in appendix C)
Test cable 4 (fabrication instructions in appendix C)
Test cable 5 (fabrication instructions in appendix C)

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
5	Set the MONITOR switch to ALL and measure resistance from J804-D to J802-C.	0 ohms.	Go to step 6.	Repair faulty circuit.
6	Set the MONITOR switch to A and measure resistance from J804-D to J802-C.	0 ohms.	Go to step 7.	Repair faulty circuit.
7	Set the MONITOR switch to B and measure resistance from J804-D to J802-C.	0 ohms.	Go to step 8.	Repair faulty circuit.
8	Set the MONITOR switch to C and measure resistance from J804-F to J802-C.	0 ohms.	Go to step 9.	Repair faulty circuit.
9	Set the MONITOR switch to INT ONLY and measure resistance from J804-H to J803-C.	0 ohms.	Go to step 10.	Repair faulty circuit.
10	Set the MONITOR switch to ALL.			
11	Connect TS-352B/U between J802-B and J804-L.			
12	Rotate the VOLUME control throughout its range.	From between 9 and 11 kohms to between 0 and 35 ohms smoothly.	Go to step 13.	Replace VOLUME control R801.
	NOTE			
	In some units, R801 may be 100 kohms. Normal indication in step 12 is from between 90 and 110 kohms to between 0 and 35 ohms. Step 14 should indicate infinity. (R801 terminal L is not connected.)			
13	Connect TS-352B/U between terminals E and A of J802.			
14	Rotate VOLUME control throughout its range.	From between 9 and 11 kohms to between 0 and 35 ohms.	Go to step 15.	Attach terminal L of R801 to ground.
15	Connect a 150 ohm resistor to terminals K and A of test cable 4.			
16	Turn off PP-1104/G and connect the positive lead to C and negative lead to A (ground) of test cable 4.			
17	Connect a 150 ohm resistor to the output of AN/URM-127. Use the ME-30(*)/U, connected across the resistor, to measure the output signal level of the AN/URM-127.			

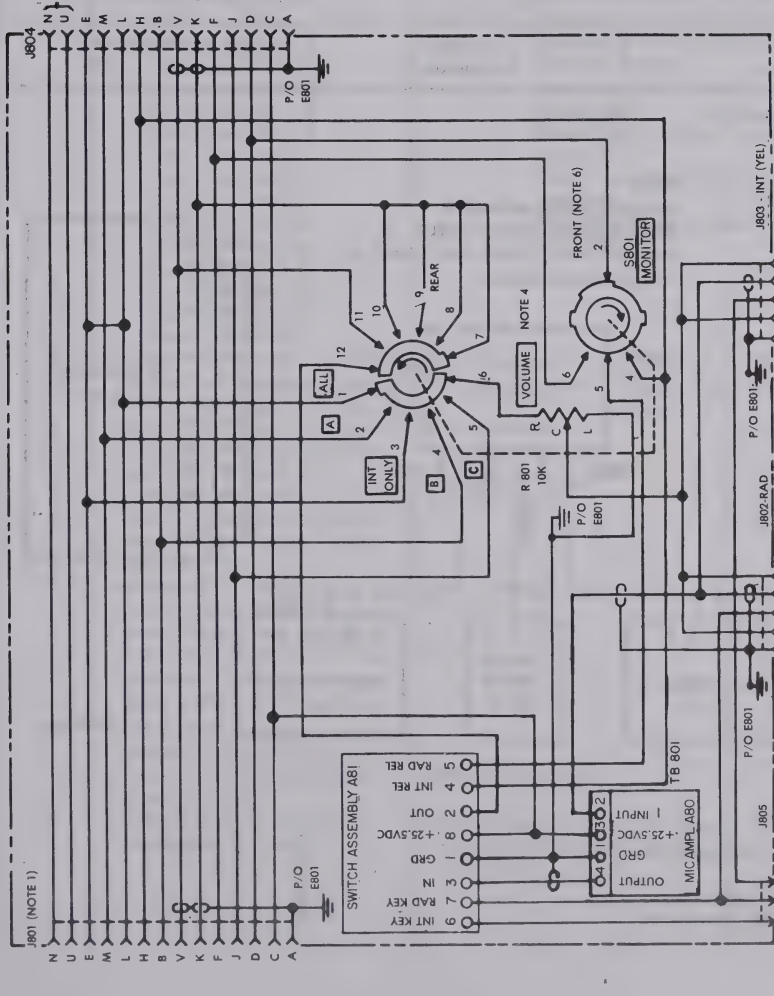
b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
	 *Test Equipment Setup*			
18	Connect AN/USM-281A to the TS-723B/U OSCILLOSCOPE terminals.			
19	Set the C-2298/VRC MONITOR switch to ALL.			
20	Turn on and set the output of the PP-1104/G to 22 Vdc.			
21	Connect the AN/URM-127 to terminals D and A (ground) of test cable 2 attached to J802.			
22	Turn on and adjust AN/URM-127 output to 500 Hz at 0.007 V.			
23	Connect TS-723B/U METER leads to terminals K and A (ground) of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 24.	Replace A80.
24	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 25.	Replace A80.
25	Adjust AN/URM-127 output to 1000 Hz at 0.007 V.			
26	Connect TS-723B/U METER leads to terminals K and A of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 27.	Replace A80.
27	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 28.	Replace A80.
28	Adjust AN/URM-127 output to 3000 Hz at 0.007 V.			

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
29	Connect TS-723B/U METER leads to terminals K and A of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 30.	Replace A80.
30	Connect TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 31.	Replace A80.
31	Set the PP-1104/G to 25.5 Vdc.			
32	Connect the TS-723B/U METER leads to terminals K and A of test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 33.	Replace A80.
33	Connect the TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 34.	Replace A80.
34	Set the PP-1104/G to 30 Vdc.			
35	Connect the TS-723B/U METER leads to terminals K and A on test cable 4.	Between 0.174 and 0.277 Vac.	Go to step 36.	Replace A80.
36	Connect the TS-723B/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281A.	Go to step 37.	Replace A80.
37	Remove the AN/URM-127 (with ME-30(*)/U and resistor) from J802 and connect it to terminals D and A of test cable on J803.			
38	Connect the TS-723B/U METER leads to terminals K and A of test cable 4. Record the reading for use in steps 39 to 42.	Between 0.174 and 0.277 Vac.	Go to step 39.	Replace A80.
39	Connect TS-723B/U METER leads to terminals K and A of test cable 4. Rotate MONITOR switch to A, INT ONLY and B.	Same as step 38 in each position.	Go to step 40.	Replace or repair faulty S801 circuit.
40	Set MONITOR swtich to C.			
41	Change 150 ohm resistor connector from terminal K to terminal V of test cable 4.			
42	Connect TS-723B/U METER leads to terminals K and A of test cable 4.	Same as step 38.	Go to step 43.	Replace or repair faulty S801 circuit.
43	Turn off and disconnect PP-1104/G, TS-723B/U, and AN/URM-127.			
44	Return C-2298/VRC to operational condition.			

2-9. C-10456/VRC TROUBLESHOOTING



E19XV026

C-10456/VRC, Schematic Diagram

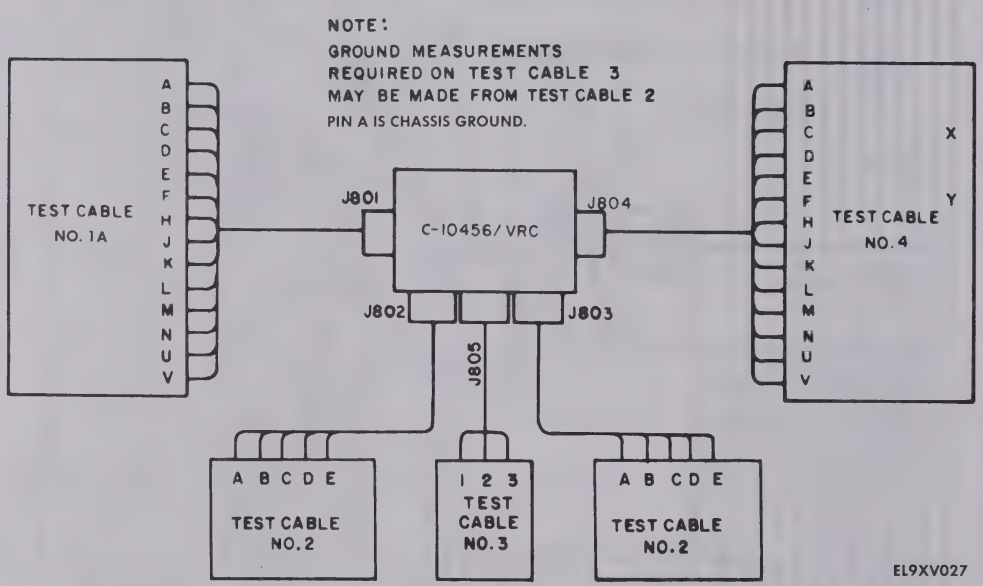
2-9. C-10456/VRC TROUBLESHOOTING – Continued

a. Fault Verification. Fault verification for the C-10456/VRC consists of checking the C-10456/VRC to make sure that the problem reported by organizational maintenance exists. This is done by performing the operational check in 2-17. Also, you must perform the operational check to make sure that you have solved the problem.

b. Troubleshooting Actions. The following paragraphs provide tabular instructions to guide direct support maintenance personnel in fault isolation of the C-10456/VRC. Refer to the C-10456/VRC schematic diagram while troubleshooting.

Before beginning to troubleshoot, remove the back cover from the C-10456/VRC by loosening four captive screws. When finished troubleshooting, apply a light coating of insulating silicone compound to preformed packing, replace back cover, and tighten four captive screws.

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
1	Connect the test cables as shown.			


NOTE:
GROUND MEASUREMENTS REQUIRED ON TEST CABLE 3 MAY BE MADE FROM TEST CABLE 2
PIN A IS CHASSIS GROUND.
TEST CABLE NO. 1A
A B C D E F H J K L M N U V
J801
C-10456/VRC
J804
J802
J803
J805
A B C D E F H J K L M N U V X Y
TEST CABLE NO. 4
A B C D E
TEST CABLE NO. 2
1 2 3
TEST CABLE NO. 3
A B C D E
TEST CABLE NO. 2
EL9XV027

C-10456/VRC, Test Setup

2	Set the TS-352B/U to measure resistance RX1.			
3	Set the VOLUME control on the C-10456/VRC fully clockwise.			

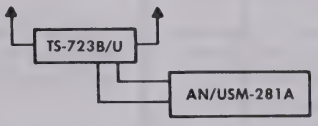
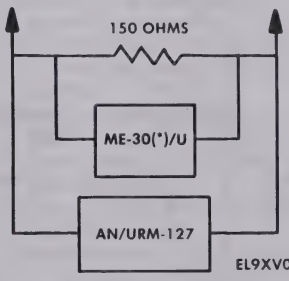
b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
4	Make continuity reading between the terminals of test cables connected to the jacks as indicated below: J801-A to J802-A J801-A to J804-A J801-B to J804-B J801-C to J804-C J801-D to J804-D J801-F to J804-F J801-H to J804-H J801-J to J804-J J801-K to J804-K J801-L to J804-L J801-M to J804-M J801-N to J804-N J801-U to J804-U J801-V to J804-U J801-E to J801-L J804-E to J804-L J802-B to J802-E J802-B to J803-B J802-D to J803-B J802-E to J803-E J802-C to J805-3 J803-C to J805-1	0 ohms.	If continuity is not obtained repair the faulty circuit	
		Test Equipment Required Power Supply PP-1104/G Multimeter TS-352B/U Electronic Voltmeter ME-30/U Spectrum Analyzer TS-723(*)/U Signal Generator AN/URM-127 Oscilloscope AN/USM-281A 150 ohm resistor Test cable 1A (fabrication instructions in appendix C) Test cable 2 (fabrication instructions in appendix C) Test cable 3 (fabrication instructions in appendix C) Test cable 4 (fabrication instructions in appendix C)		
5	Set MONITOR switch to ALL and measure resistance between J801-L and J802-E.	0 to 35 ohms.	Go to step 6.	Repair faulty circuit.
6	Set MONITOR switch to A and measure resistance between J801-M and J802-E.	0 to 35 ohms.	Go to step 7.	Repair faulty circuit.
7	Set MONITOR switch to INT ONLY and measure resistance between J801-L and J802-E.	0 to 35 ohms.	Go to step 8.	Repair faulty circuit.
8	Set MONITOR switch to B and measure resistance between J801-B and J802-E.	0 to 35 ohms.	Go to step 9.	Repair faulty circuit.
9	Set MONITOR switch to C and measure resistance between J801-J and J802-E.	0 to 35 ohms.	Go to step 10.	Repair faulty circuit.
10	Set MONITOR switch to ALL.			
11	Connect TS-352B/U between terminal E of J802 and terminal L of J801.			
12	Rotate VOLUME control throughout its range.	From between 9 and 11 kohms to between 0 and 35 ohms smoothly.	Go to step 13.	Replace VOLUME control R801.

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
	NOTE **In some units, R801 may be 100 kohms. Normal indication in step 12 is from between 90 and 110 kohms to between 0 and 35 ohms. Step 14 should indicate infinity.**			
13	Connect TS-352B/U between terminals E and A of J802.			
14	Rotate VOLUME control throughout its range.	From between 9 and 11 kohms to between 0 and 35 ohms.	Go to step 15.	Attach terminal L of R801 to ground.
15	Connect a 150 ohm resistor to terminals K and A of test cable 4.			
16	Turn off PP-1104/G and connect its positive lead to terminal X and its negative lead to terminal A (ground) of test cable 4.			
17	Set the C-10456/VRC MONITOR switch to ALL.			
18	Connect a 68,000 ohm resistor to terminals Y and H of test cable 4.			
19	Ground terminal C of test cable 4 with jumper lead.			
20	Turn on PP-1104/G and adjust its output to 25.5 Vdc.			
21	Connect a jumper lead between terminals Y and X of test cable 4.			
22	Use TS-352B/U and measure dc voltage between terminal 2 of test cable 3 and ground.	Greater than +5 V.	Go to step 23.	Replace switch assembly A81.
23	Measure voltage between terminal 3 of test cable 3 and ground.	Less than +1.5 V.	Go to step 24.	Replace switch assembly A81.
24	Remove jumper from terminal Y and connect it between terminals D and X of test cable 4.			
25	Measure voltage between terminal 3 of test cable 3 and ground.	Greater than +15 V.	Go to step 26.	Replace switch assembly A81.
26	Remove jumper between terminals X and D of test cable 4.			
27	Remove ground from terminal C and ground terminal D of test cable 4.			

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
28	Connect jumper between terminals C and X of test cable 4.			
29	Measure voltage between terminal 3 of test cable 3 and ground.	Greater than +15 V.	Go to step 30.	Replace switch assembly A81.
30	Remove ground from terminal O and ground terminal H of test cable 4.			
31	Measure voltage between terminal 2 of test cable 3 and ground.	Greater than +15 V.	Go to step 32.	Replace switch assembly A81.
32	Connect AN/USM-281A to the TS-723B/U OSCILLOSCOPE terminals.	 EL9XV009		
33	Connect a 150 ohm resistor to the output of the AN/URM-127, and ME-30(*)/U across the resistor as shown.	 EL9XV023		
34	Connect the AN/URM-127 to terminals D and A (ground) of test cable 2 attached to J802. Adjust the output frequency to 1000 Hz.			
35	Adjust the AN/URM-127 output signal level to 0.007 V as read on the ME-30(*)/U.			
36	Connect the TS-723(*)/U METER terminals to terminals K and A of test cable 4.	Less than 0.003 Vac.	Go to step 37.	Replace faulty A81.

NOTE

Use the ME-30(*)/U to measure the output signal level of the AN/URM-127 in the remainder of the procedures.

b. Troubleshooting Actions - Continued

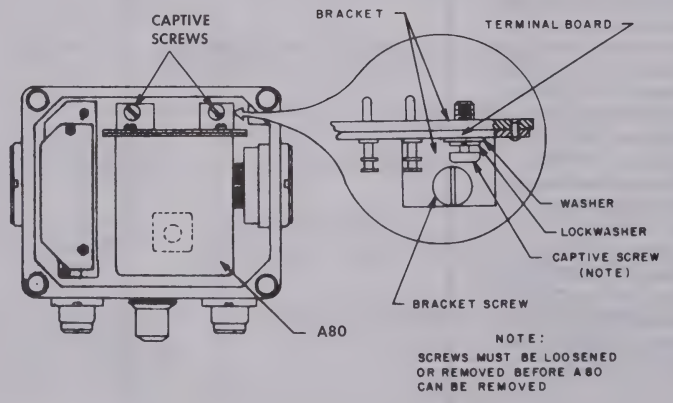
Step	Instruction	Normal Indication	Indication Obtained? Yes	No
37	Ground terminal C of test cable 2 connected to J802. Read voltage on TS-723(*)/U. Record reading for reference.	Between 0.15 and 0.30 Vac.	Go to step 38.	Go to step 79.
38	Remove the ground from terminal C of test cable 2.			
39	Ground terminal 2 of test cable 3. Read the voltage indication on the TS-723(*)/U.	Same as step 36.	Go to step 40.	Go to step 79.
40	Connect the TS-723(*)/U AF INPUT leads to terminals K and A of test cable 4 and measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 41.	Go to step 79.
41	Remove ground from terminal 2 of test cable 3.			
42	Ground terminal C of test cable 2 connected to J802. Read distortion on TS-723(*)/U.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 43.	Go to step 79.
43	Set the outside of the PP-1104/G to 22 Vdc.			
44	Connect the TS-723(*)/U METER terminals to terminals K and A of test cable 4.	Less than 0.003 Vac.	Go to step 45.	Replace faulty A81.
45	Ground terminal C of test cable 2 connected to J802. Read voltage on TS-723(*)/U. Record reading for reference.	Between 0.15 and 0.30 Vac.	Go to step 46.	Go to step 79.
46	Remove the ground from terminal C of test cable 2.			
47	Ground terminal 2 of test cable 3. Read the voltage indication on the TS-723(*)/U.	Same as step 45.	Go to step 48.	Go to step 79.
48	Connect the TS-723(*)/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 49.	Go to step 79.
49	Remove ground from terminal 2 of test cable 3.			
50	Ground terminal C of test cable 2 connected to J802. Read distortion on TS-723(*)/U.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 51.	Go to step 79.
51	Set the output of the PP-1104/G to 30 Vdc.			
52	Connect the TS-723(*)/U METER terminals to terminals K and A of test cable 4.	Less than 0.003 Vac.	Go to step 53.	Replace faulty A81.
53	Ground terminal C of test cable 2 connected to J802. Read voltage on TS-723(*)/U. Record reading for reference.	Between 0.15 and 0.30 Vac.	Go to step 54.	Go to step 79.

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
54	Remove the ground from terminal C of test cable 2.			
55	Ground terminal 2 of test cable 3. Read the voltage indication on the TS-723(*)/U.	Same as step 53.	Go to step 56.	Go to step 79.
56	Connect the TS-723(*)/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 57.	Go to step 79.
57	Remove ground from terminal 2 of test cable 3.			
58	Ground terminal C of test cable 2 connected to J802. Read distortion on TS-723(*)/U.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 59.	Go to step 79.
59	Adjust the output of the AN/URM-127 to 500 Hz at 0.007 Vac.			
60	Connect the TS-723(*)/U METER terminals to terminals K and A of test cable 4.	Less than 0.003 Vac.	Go to step 61.	Replace faulty A81.
61	Ground terminal C of test cable 2 connected to J802. Read voltage on TS-723(*)/U. Record reading for reference.	Between 0.15 and 0.30 Vac.	Go to step 62.	Go to step 79.
62	Remove the ground from terminal C of test cable 2.			
63	Ground terminal 2 of test cable 3. Read the voltage indication on the TS-723(*)/U.	Same as step 60.	Go to step 64.	Go to step 79.
64	Connect the TS-723(*)/U AF INPUT leads to terminals K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 65.	Go to step 79.
65	Remove ground from terminal 2 of test cable 3.			
66	Ground terminal C of test cable 2 connected to J802. Read distortion on TS-723(*)/U.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 67.	Go to step 79.
67	Adjust output of AN/URM-127 to 3000 Hz at 0.007 Vac.			
68	Connect the TS-723(*)/U METER terminals to terminals K and A of test cable 4.	Less than 0.003 Vac.	Go to step 69.	Replace faulty A81.
69	Ground terminal C of test cable 2 connected to J802. Read voltage on TS-723(*)/U. Record reading for reference.	Between 0.15 and 0.30 Vac.	Go to step 70.	Go to step 79.
70	Remove the ground from terminal C of test cable 2.			

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
71	Ground terminal 2 of test cable 3. Read the voltage indication on the TS-723(*)/U.	Same as step 69.	Go to step 72.	Go to step 79.
72	Connect the TS-723(*)/U AF INPUT leads to terminal K and A of test cable 4. Measure distortion.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 73.	Go to step 79.
73	Remove ground from terminal 2 of test cable 3.			
74	Ground terminal C of test cable 2 connected to J802. Read distortion on TS-723(*)/U.	Less than 2% and undistorted sine wave on AN/USM-281.	Go to step 75.	Go to step 79.
75	Set the MONITOR switch to C.			
76	Change the 150 ohm resistor from terminal K to terminal V of test cable 4.			
77	Connect the TS-723(*)/U METER leads to terminals V and A on test cable 4.			
78	Ground terminal C of test cable 2 connected to J802. Read voltage on TS-723(*)/U.	Between 0.15 and 0.30 Vac.	Go to step 91.	Go to step 79.
79	Turn off PP-1104/G and disconnect it from test cable 4.			
80	Disconnect the AN/URM-127 and TS-723(*)/U.			
81	Locate A80 module and loosen two captive screws.			
82	Carefully remove A80 module.			
83	Connect the positive terminal of PP-1104/G terminal 3 and the negative terminal to terminal 1 (ground) on A80.			



C-10456/VRC, Internal View

b. Troubleshooting Actions - Continued

Step	Instruction	Normal Indication	Indication Obtained? Yes	No
84	Connect the output of AN/URM-127 (with ME-30(*)/U and 10 ohm resistor) to terminals 1 and 2 of A80.			
85	Connect a 150 ohm resistor to terminals 1 and 4 of A80.			
86	Turn on PP-1104/G and adjust output to 22 Vdc.			
87	Turn on AN/URM-127 and adjust output to 1000 Hz at 0.007 Vac.			
88	Connect the TS-723(*)/U METER leads to terminals 1 and 4 on A80.	Between 0.15 and 0.30 Vac.	Replace switch assembly A81.	Replace A80.
89	Connect TS-723(*)/U AF INPUT leads to terminals 1 and 4 on A80.	Less than 2% distortion.	Replace switch assembly A81.	Replace A80.
90	Remove power, disconnect test equipment, and return C-10456/VRC to operational condition.			

Section III. MAINTENANCE PROCEDURES

2-10. GENERAL MAINTENANCE PROCEDURES

This section contains direct support maintenance procedures for the AN/VIC-1(V), including cleaning, operational checks, and removal and replacement procedures.

2-11. CLEANING

Cleaning of units comprising AN/VIC-1(V) should be performed as necessary.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLORO-TRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

Clean the equipment with cheesecloth dampened, not wet, with trichlorotrifluoroethane.

2-12. CONTROL BOX OPERATIONAL CHECK METHODS

Two methods of performing the operational checks on C-2296/VRC, C-2297/VRC, C-2298/VRC, and C-10456/VRC are listed in this section.

One procedure uses a receiver-transmitter and optional test box. The other uses only test equipment.

Either method is acceptable.

2-13. AM-1780/VRC MAINTENANCE

a. Operational Check

This task covers the operational check of the AM-1780/VRC.

INITIAL SETUP

Test Equipment Required

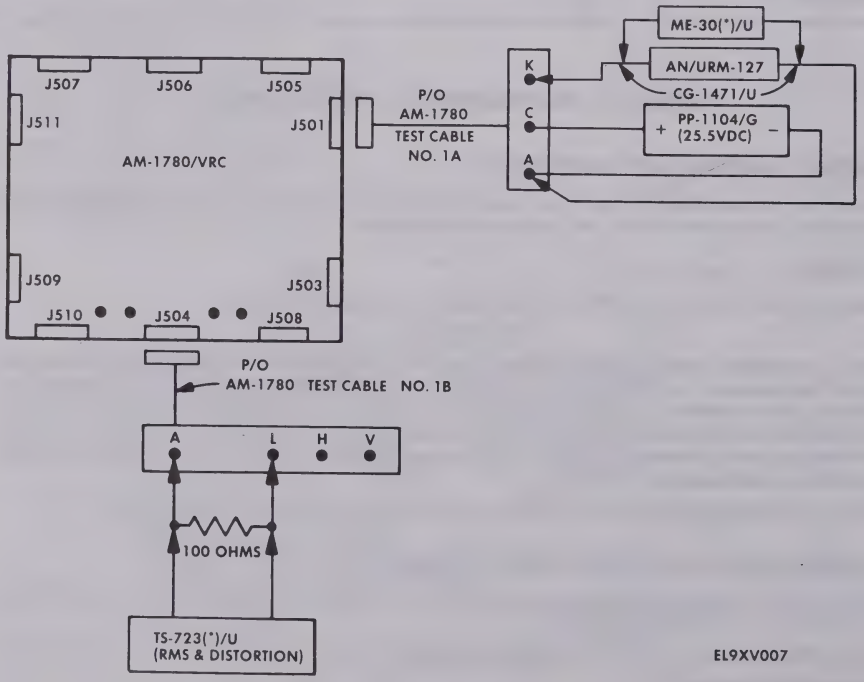
Power Supply PP-1104/G
Multimeter TS-352B/U
Electronic Voltmeter ME-30/U
Spectrum Analyzer TS-723(*)/U
Signal Generator AN/URM-127
Cable Assembly CG-1471/U
100 ohm resistor
600 ohm resistor
Test cable 1A and 1B (fabrication instructions in appendix C)
Test cable 4 (fabrication instructions in appendix C)
Test cable 5 (fabrication instructions in appendix C)

Equipment Condition

Test cables, power supply, spectrum analyzer, signal generator with electronic voltmeter, and 100 ohm resistor connected as shown.

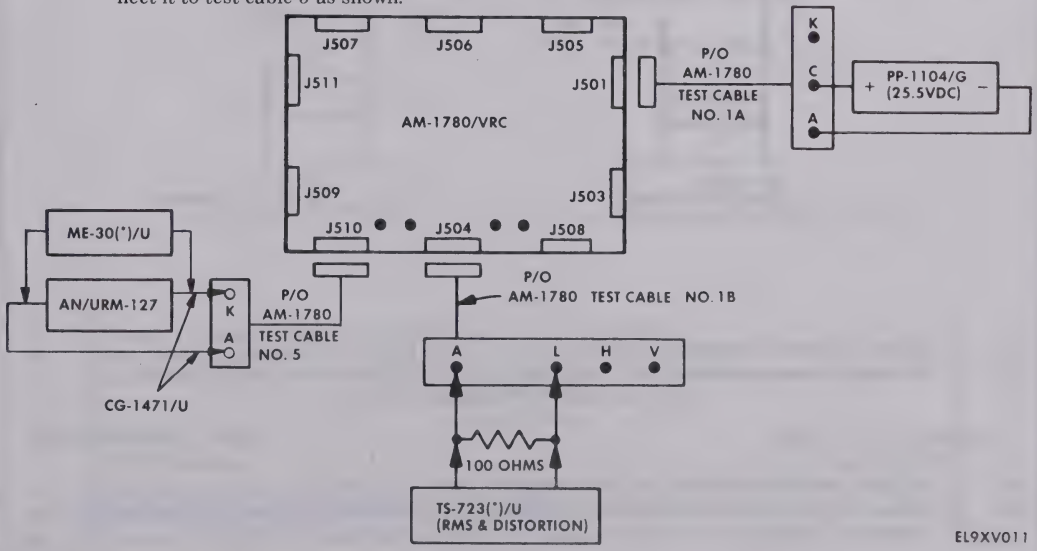
Power supply turned on and set for 25.5 Vdc.

Signal generator turned on and set for 1 kHz.



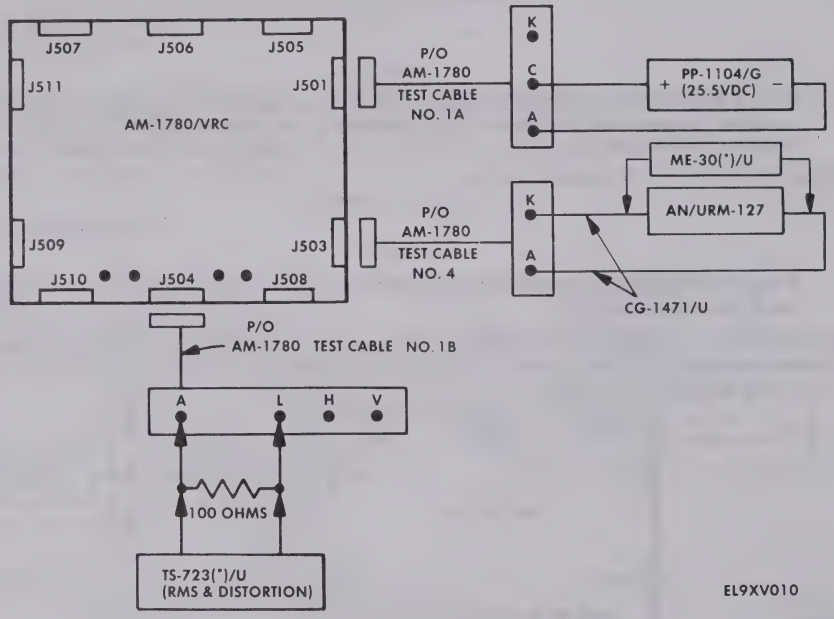
a. Operational Check - Continued

Step	Operation	Normal indication	Corrective procedure
1	Set AM-1780/VRC INSTALLATION switch to OTHER, MAIN PWR to NORM, and POWER CKT BKR to ON.	POWER lamp lights.	Refer to troubleshooting actions, 2-5c(11).
2	Adjust output of AN/URM-127 to obtain between 11 and 13 Vac on TS-723(*)/U. Record TS-723(*)/U voltage.	Between 11 and 13 Vac.	Refer to troubleshooting actions, 2-5c(1).
3	Read output level of AN/URM-127 on ME-30(*)/U and record it for reference.	Between 0.170 and 0.276 Vac.	Refer to troubleshooting actions, 2-5c(1).
	NOTE **For AM-1780/VRC provided with variable gain amplifier assembly A250, the required output may be obtained by adjusting potentiometer R260. For AM-1780/VRC with fixed gain amplifier assembly A250B, no adjustment is provided.**		
4	Adjust TS-723(*)/U to measure distortion.	Less than 10% distortion.	Replace assembly A520.
	NOTE **For AM-1780/VRC with fixed gain amplifier assembly A250B, distortion will normally be less than 10%.**		
5	Set AM-1780/VRC POWER CKT BKR to OFF and readjust TS-723(*)/U to measure voltage.		
6	Connect test cable 5 to J510. Disconnect URM-127 with ME-30(*)/U from test cable 1A and connect it to test cable 5 as shown.		



a. Operational Check - Continued

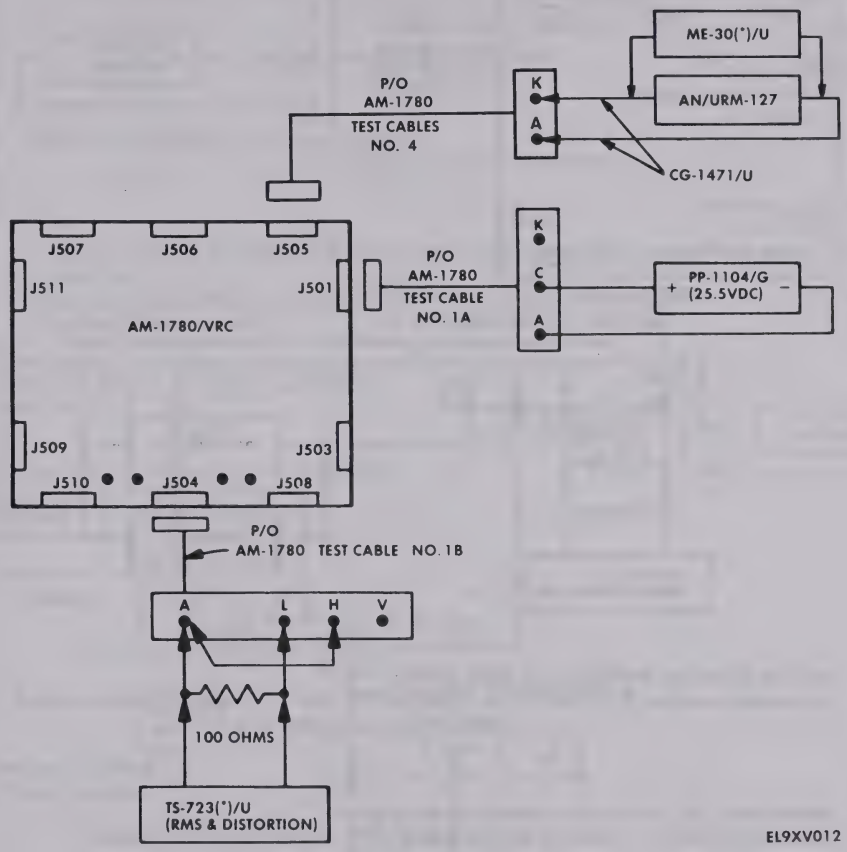
Step	Operation	Normal indication	Corrective procedure
7	Set AM-1780/VRC POWER CKT BKR to ON.		
8	If necessary, readjust AN/URM-127 output to obtain the TS-723(*)/U voltage recorder in step 2.	ME-30(*)/U reads same as in step 3.	Refer to troubleshooting actions, 2-5*c*(3).
9	Set AM-1780/VRC POWER CKT BKR to OFF. Disconnect test cable 5.		
10	Connect the cable 4 to J503. Disconnect AN/URM-127 with ME-30(*)/U from test cable 5 and connect it to test cable 4 as shown.		



11	Set AM-1780/VRC POWER CKT BKR to ON.		
12	If necessary, readjust AN/URM-127 to obtain the TS-723(*)/U voltage recorded in step 2.	ME-30(*)/U reads same as in step 3.	Refer to troubleshooting actions 2-5*c*(2).
13	Set AM-1780/VRC POWER CKT BKR to OFF.		
14	Disconnect test cable 4, AN/URM-127, and ME-30(*)/U from J503 and connect them to J505 as shown.		

a. Operational Check - Continued

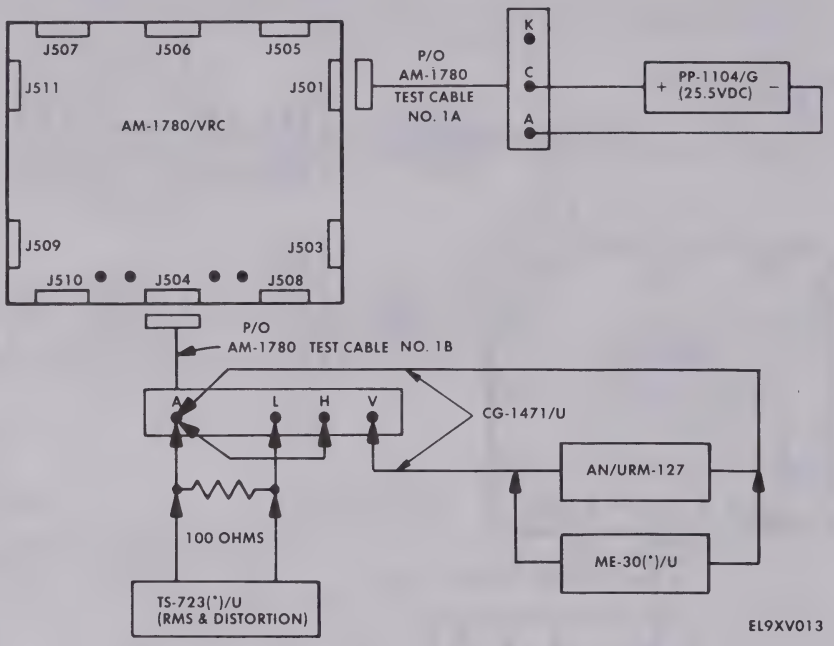
Step	Operation	Normal indication	Corrective procedure



15	Connect a jumper between terminals H and A of test cable 1B.	
16	Set AN-1780/VRC POWER CKT BKR to ON.	
17	If necessary, readjust AN/URM-127 to obtain the TS-723(*)/U voltage recorded in step 2.	ME-30(*)/U reads same as in step 3.
		Refer to troubleshooting actions in 2-5c(5).
18	Set AM-1780/VRC POWER CKT BRK to OFF.	
19	Disconnect test cable 4, AN/URM-127, and ME-30(*)/U.	
20	Connect AN/URM-127 with ME-30(*)/U to terminals V and A of test cable 1B as shown.	

a. Operational Check - Continued

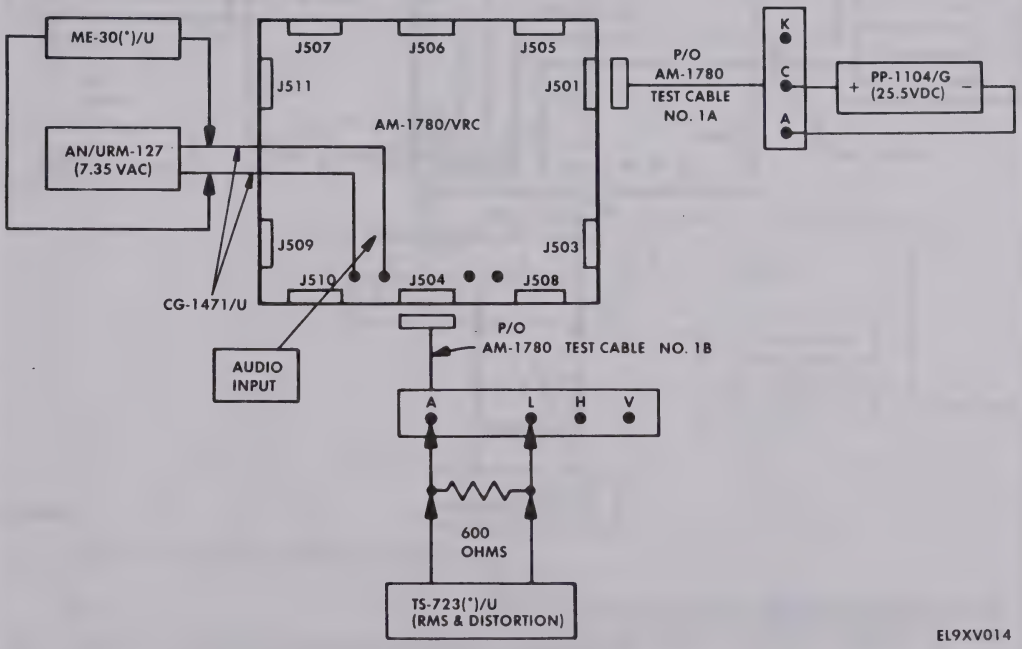
Step	Operation	Normal indication	Corrective procedure



21	Set AM-1780/VRC POWER CKT BKR to ON.		
22	If necessary, readjust AN/URM-127 to obtain the TS-723(*)/U voltage recorded in step 2.	ME-30(*)/U reads same as in step 3.	Refer to troubleshooting actions 2-5*c*(6).
23	Record the 1 kHz gain in dB as referenced for step 24.		
24	Adjust AN/URM-127 frequency and check gain in dB on TS-723(*)/U as follows:		
	150 Hz	−30 dB minimum	
	300 Hz	Between −1 and −9 dB	
	1,000 Hz	0 dB (references)	
	3,500 Hz	Between −1 and −9 dB	
	5,000 Hz	−14 dB minimum	
			Replace amplifier assembly A250 (2-13*c*(6)).
25	Set AM-1780/VRC POWER CKT BKR to OFF.		
26	Disconnect 100 ohm resistor from terminals L and A of test cable 1B and connect 600 ohm resistor in its place.		

a. Operational Check - Continued

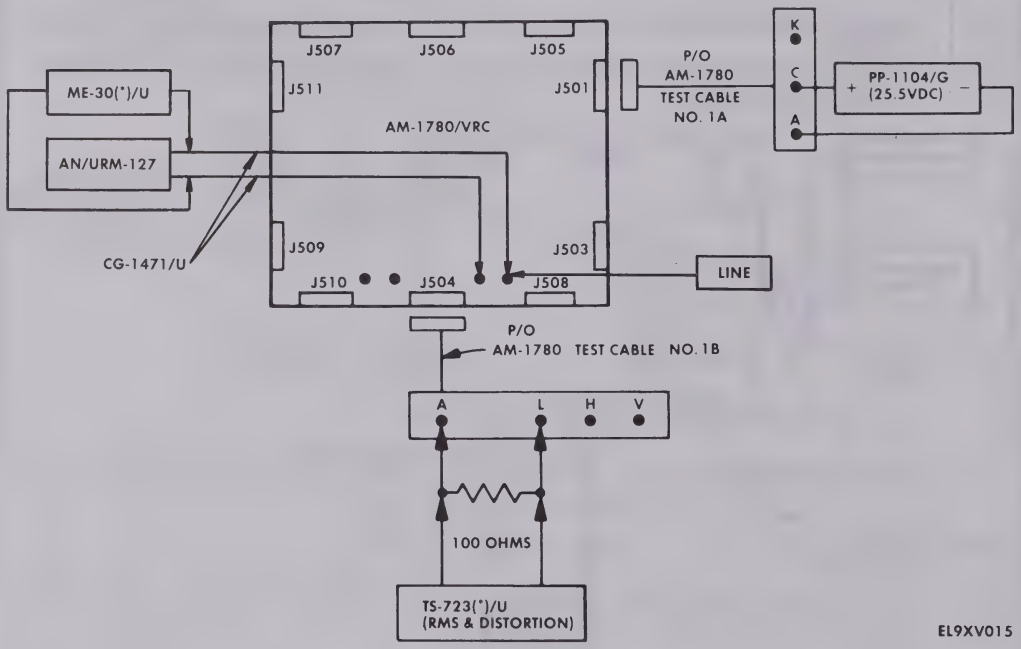
Step	Operation	Normal indication	Corrective procedure
27	Set AN-1780/VRC POWER CKT BKR to ON.	TS-723(*)/U reads no less than 11 Vac. Record voltage for reference in step 32.	Replace amplifier assembly A250 (2-13c(6)).
28	Readjust TS-723(*)/U to measure distortion.	Distortion should not exceed 10%.	Replace assembly A520 (2-13c(4)).
29	Set AM-1780/VRC POWER CKT BKR to OFF. Remove jumper from terminals H and A of test cable 1B.		
30	Disconnect AN/URM-127 with ME-30(*)/U from test cable 1B and connect it to AUDIO INPUT binding posts as shown.		



31	Set AM-1780/VRC POWER CKT BKR to ON.		
32	Readjust AN/URM-127 output to 1 kHz at 7.35 Vac.	TS-723(*)/U reads same as in step 27.	Refer to troubleshooting actions, 2-5c(7).
33	Set AM-1780/VRC POWER CKT BKR to OFF.		

a. Operational Check - Continued

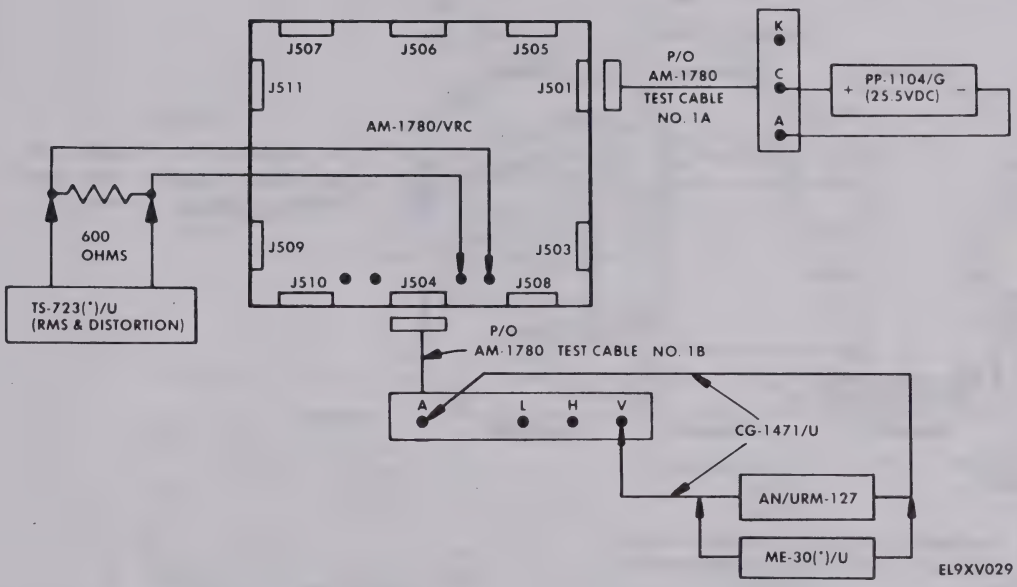
Step	Operation	Normal indication	Corrective procedure
34	Disconnect 600 ohm resistor from terminals L and A of test cable 1B and connect 100 ohm resistor in its place.		
35	Set AM-1780/VRC POWER CKT BKR to ON. Readjust AN/URM-127 to obtain TS-723(*)/U voltage recorded in step 2.	ME-30(*)/U reads same as in step 3.	Refer to troubleshooting actions, 2-5*c*(7).
36	Set AM-1780/VRC POWER CKT BKR to OFF.		
37	Disconnect the AN/URM-127 with ME-30(*)/U from AUDIO INPUT binding posts and connect them to LINE (TEL/REMOTE) binding posts.		



38	Set AM-1780/VRC POWER CKT BKR to ON.		
39	Readjust AN/URM-127 output to 0.44 Vac.	Between 11 and 13 Vac on TS-723(*)/U.	Refer to troubleshooting actions, 2-5*c*(8).
40	Connect jumper between terminals H and A of test cable 1B.	0 V on TS-723(*)/U.	Refer to troubleshooting actions, 2-5*c*(8).

a. Operational Check - Continued

Step	Operation	Normal indication	Corrective procedure
41	Set AM-1780/VRC POWER CKT BKR to OFF and disconnect jumper from terminals H and A of test cable 1B.		
42	Disconnect AN/URM-127 with ME-30(*)/U from LINE binding posts and connect them to terminals V and A of test cable 1B.		
43	Connect 600 ohm resistor and TS-723(*)/U to LINE binding posts as shown.		



44	Set AM-1780/VRC POWER CKT BKR to ON.	0 V on TS-723(*)/U.	Refer to troubleshooting actions, 2-5c(8).
45	Connect jumper between terminals H and A of test cable 1B.		
46	Set output of AN/URM-127 to 0.22 Vac read on ME-30(*)/U.	Between 0.35 and 0.62 Vrms on TS-723(*)/U.	Refer to troubleshooting actions, 2-5c(10).
47	Remove power, disconnect test equipment, and return AM-1780/VRC to operational condition.		

b. Inspection of Installed Items. Do the following anytime back cover is removed from AM-1780/VRC.

(1) Inspect all sides of case for holes, dents, and gouges.

(2) Inspect inside of unit for general cleanliness.

(3) Inspect for loose or missing hardware.

(4) Inspect inside for damaged components or assemblies.

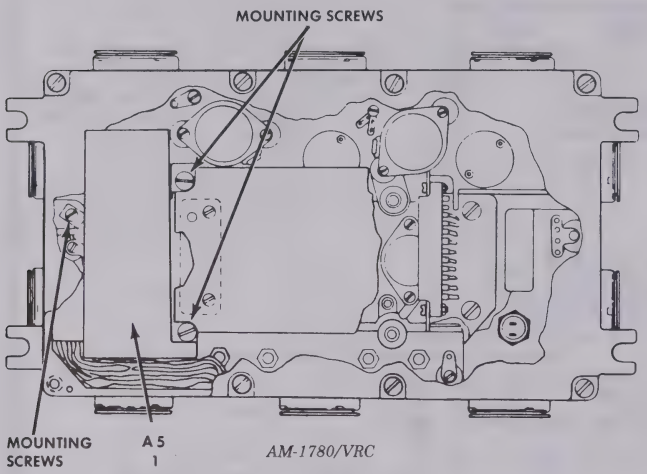
(5) Inspect for loose or broken connections.

c. Removal and Replacement

(1) Filter Assembly A-5, Old Version

REMOVAL

1. Loosen eight captive screws and lift off back cover.
2. Remove three mounting screws and lift out filter assembly, A5.



AM-1780/VRC

NOTE

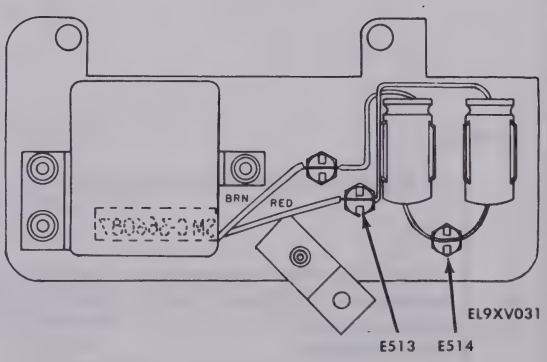
To replace one version of the filter assembly with other version, refer to 2-13c(3).

3. Use masking tape and mark which standoff (E512, E513 and E514) each lead attaches to.
4. Unsolder the leads.

REPLACEMENT

1. Solder the three leads to the proper standoffs.
2. Replace the filter assembly and tighten the three mounting screws.
3. Apply light coating of insulating silicone compound to preformed packing on back cover.
4. Replace cover and tighten eight captive screws.

(2) Filter Assembly A5, New Version



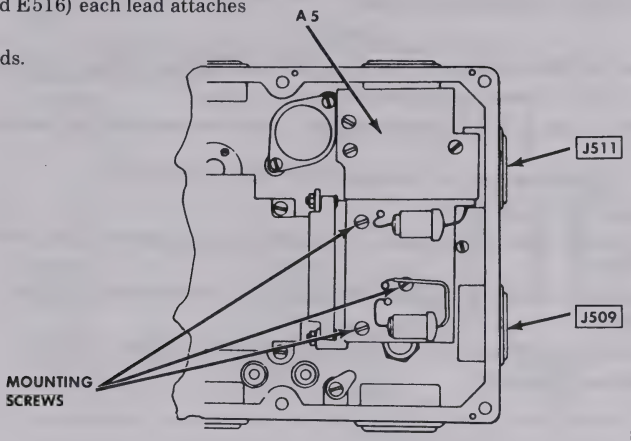
New Filter Assembly

c. *Removal and Replacement* - Continued

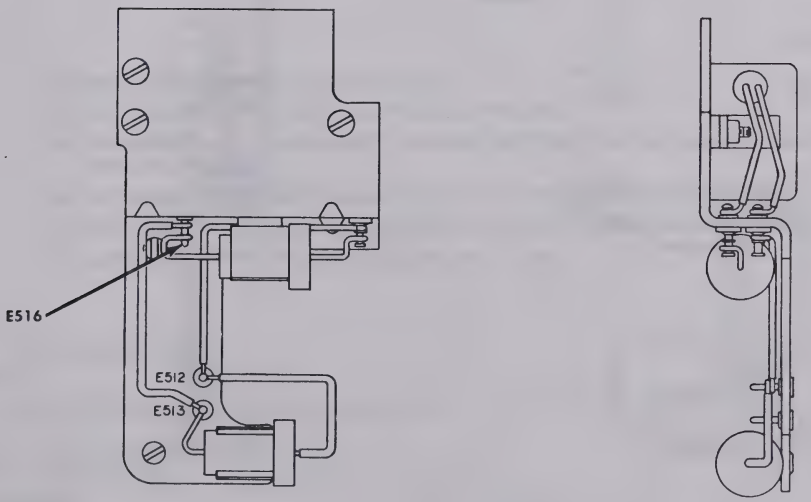
(2) Filter Assembly A5, New Version

REMOVAL

1. Loosen eight captive screws and remove back cover.
2. Remove three mounting screws and lift out A5 assembly.
3. Use making tape and mark which standoff (E514, E515, and E516) each lead attaches to.
4. Unsolder the leads.



P/O AM-1780/VRC



Old Filter Assembly

c. Removal and Replacement - Continued

(2) Filter Assembly A5, New Version – Continued

REPLACEMENT

1. Solder the leads to proper standoffs.
2. Replace the filter assembly and tighten three mounting screws.
3. Apply a light coating of insulating silicone compound to preformed packing on back cover.
4. Replace back cover and tighten eight captive screws.

NOTE

To replace the filter with one that is a different version, refer to 2-13c(3).

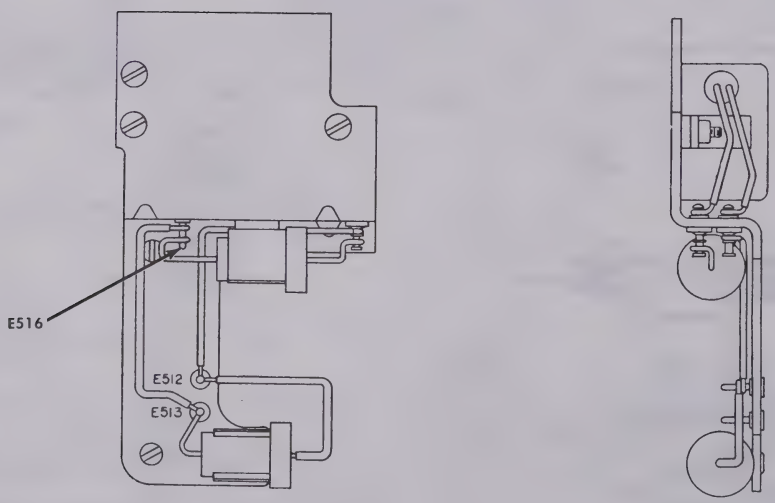
(3) Replacing one version of filter assembly with the other version:

(a) Use 22 AWG stranded wire and prepare three 12-inch long jumper wires, 2 white-red and 1 black.

(b) Remove the three wires from the defective filter.

(c) If replacement filter is old version:

- Connect a white-red jumper to E514. (E514 is connected through a brown wire to L501.)
- Connect a white-red jumper to E515. (E515 is connected through a red wire to L501.)
- Connect the black jumper wire to standoff terminal E516.
- Proceed to step (e).



Old Filter Assembly

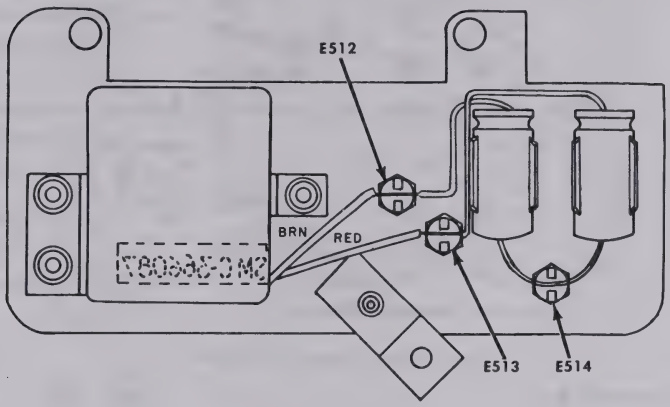
EL9XV033

c. *Removal and Replacement* - Continued

(3) Replacing One Version of Filter Assembly with the Other Version – Continued

(d) If replacement filter is new version:

- Connect a white-red jumper to E512. (E512 is connected through a brown wire to L501.)
- Connect a white-red jumper to E513. (E513 is connected through a red wire to L501.)
- Connect the black jumper to standoff terminal E514.
- Proceed to step (e).



New Filter Assembly

(e) Install the replacement filter assembly.

(f) Run the three jumper wires along the side of chassis.

(g) Connect jumpers to same colored wires removed from defective filter. Use spaghetti to cover solder points.

(h) Tie jumpers at convenient points along the wire form.

(i) Apply light coating of silicone insulating compound to preformed packing on back cover.

(j) Replace back cover and tighten eight captive screws.

(4) Assembly A520

REMOVAL

1. Loosen eight captive screws and lift off back cover.
2. Remove four mounting screws.
3. Pull A520 from J512.

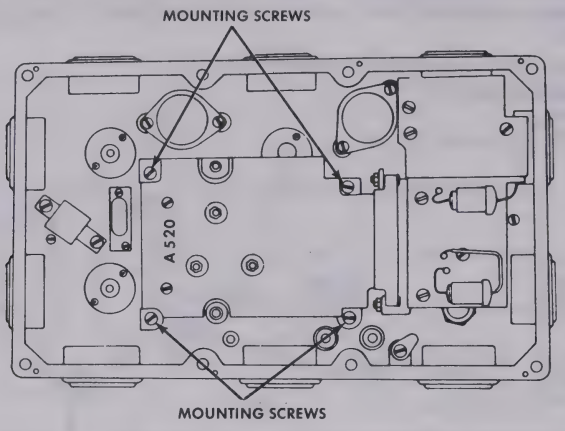
REPLACEMENT

1. Line up contracts on A520 with J512.
2. Gently push A520 into place.
3. Replace A520 and tighten four mounting screws.

c. *Removal and Replacement* - Continued

(4) Assembly A520 – Continued

4. Apply light coating of insulating compound to preformed packing on back cover.
5. Replace back cover and tighten eight captive screws.

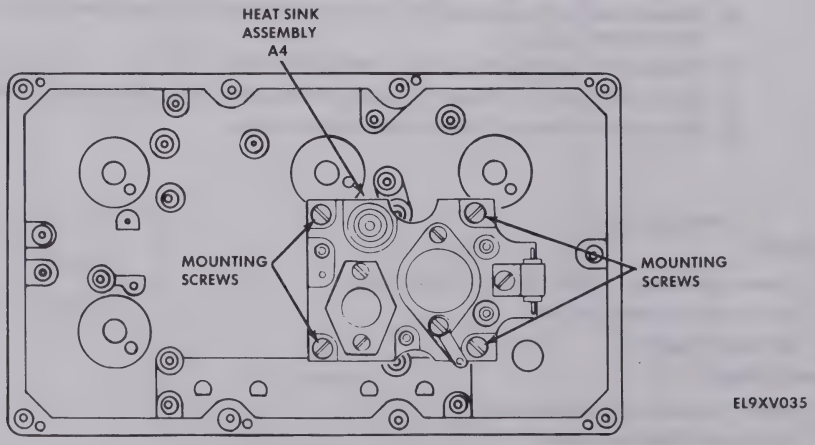


AM-1780/VRC, Assembly A520 Location

(5) Heat Sink Assembly A4

REMOVAL

1. Remove A520 per 2-13*c*(4).
2. Use masking tape and mark four leads with their attachment point.
3. Unsolder the four leads.
4. Remove the four mounting screws and lift out the heat sink assembly.



AM-1780/VRC, Heat Sink Assembly A4

c. Removal and Replacement - Continued

(5) Heat Sink Assembly A4 – Continued

REPLACEMENT

1. Position the replacement heat sink assembly and tighten the four mounting screws.
2. Solder the four leads.
3. Replace A520 per 2-13*c*(4).

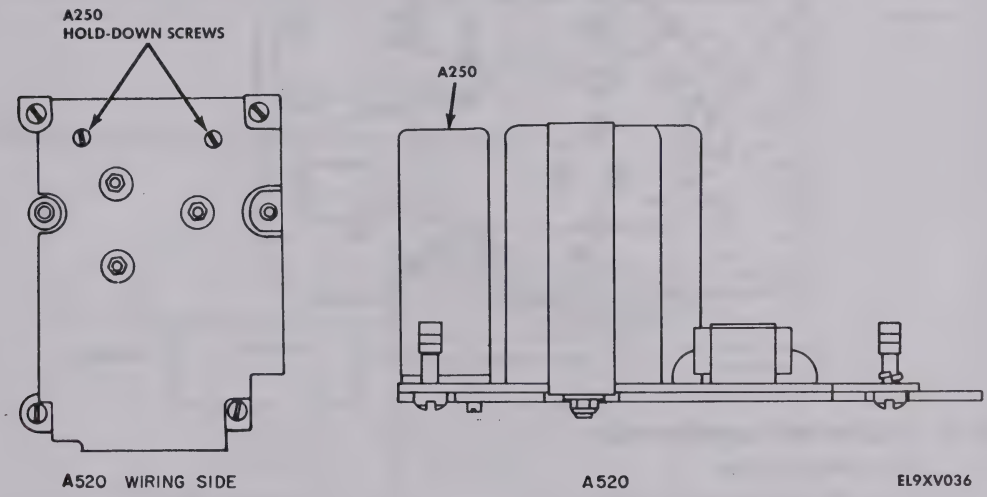
(6) Amplifier Assembly A250

REMOVAL

1. Remove A520 per 2-13*c*(14).
2. Loosen two A250 hole-down screws.
3. Gently pull A250 from A520.

REPLACEMENT

1. Line up A250 contacts with contacts on A520 and gently press A250 into place.
2. Tighten two hold-down screws.
3. Replace A520 per 2-13*c*(4).



(7) Relays

REMOVAL

1. Loosen eight captive screws and remove back cover.
2. Remove two hold-down screws on faulty relay.

NOTE

On AM-1780/VRC's with the latest version of filter assembly A5, the filter assembly must be removed to gain access to K503.

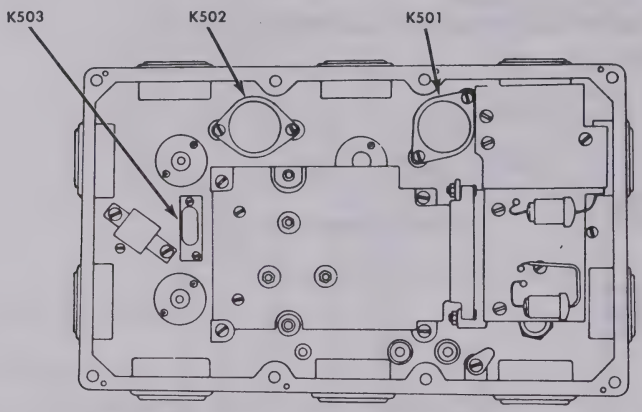
3. Pull relay from its socket.

c. Removal and Replacement - Continued

(7) Relays – Continued

REPLACEMENT

1. Check that pins on replacement relay are straight.
2. Insert relay into its socket.
3. Tighten two hold-down screws.
4. Apply light coating of silicone insulating compound to preformed packing on back cover.
5. Replace back cover and tighten eight captive screws.



AM-1780/VRC, Relay Location EL9XV037

2-14. C-2296/VRC MAINTENANCE

a. Operational Check

(1) Without Optional Test Box

This task covers the operational check of C-2296/VRC.
INITIAL SETUP Test Equipment Required Power Supply PP-1104/G Signal Generator AN/URM-127 Electronic Voltmeter ME-30(*)/U Spectrum Analyzer TS-723(*)/U Oscilloscope AN/USM-281A Multimeter TS-352(*)/U Cable Assembly CG-1471/U Test cable 5 (fabrication instructions in appendix C) 150 ohm resistor, 2 watts

a. Operational Check - Continued

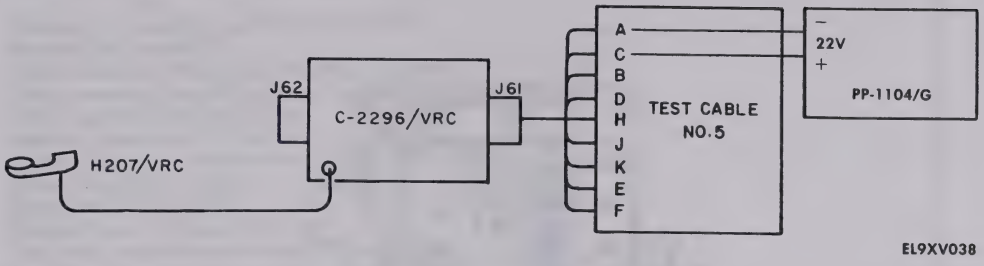
(1) Without Optional Test Box – Continued

INITIAL SETUP - Continued

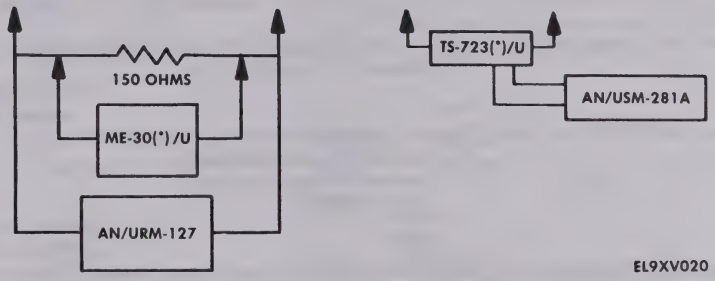
Equipment Condition

Back cover removed from C-2296/VRC.

Test cable and power supply connected to C-2296/VRC as shown.



AN/URM-127, ME-30(*)/U, and 150 ohm resistor connected as shown.

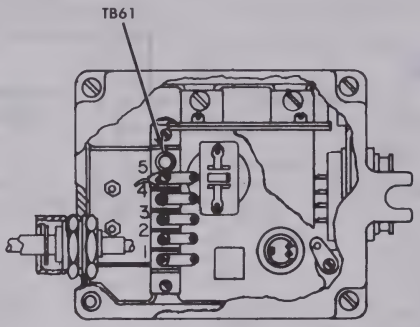


Connect AN/USM-281A to TS-723(*)/U OSCILLOSCOPE terminals.

a. *Operational Check* - Continued

(1) Without Optional Test Box – Continued

Step	Operation	Normal indication	Corrective procedure
1	Connect 150 ohm resistor between terminals K and A of test cable 5.		
2	Turn on PP-1104/G and adjust output to 22 V.		
3	Connect AN/URM-127 with ME-30(*)/U and resistor to terminal 3 of TB61 and chassis.		



C-2296/VRC, Internal View

4	Adjust output of AN/URM-127 to 500 Hz at 0.007 V. Read AN/URM-127 output level on ME-30(*)/U throughout this procedure.		
5	Connect TS-723(*)/U METER leads to terminals K and A (ground) of test cable 5.	Between 0.174 and 0.277 Vac.	Refer to troubleshooting actions, 2-6*b*.
6	Connect TS-723(*)/U AF INPUT leads to terminals K and A (ground) of test cable 5.	Less than 2% distortion and undistorted sine wave on AN/USM-281A.	Refer to troubleshooting actions, 2-6*b*.
7	Adjust output of AN/URM-127 to 3000 Hz at 0.007 Vac and repeat measurements in steps 5 and 6.		
8	Adjust output of AN/URM-127 to 1000 Hz at 0.007 Vac and repeat measurements in steps 5 and 6.		
9	Adjust output of PP-1104/G to 30.0 V and repeat measurements in steps 5 and 6.		
10	Adjust output of PP-1104/G to 25.5 V and repeat measurements in steps 5 and 6.		
11	Connect output of AN/URM-127 to terminals J and A of test cable 5.		
12	Listen to H-207/VRC earphone while rotating C-2296/VRC VOLUME control throughout its range.	Test signal heard and no distortion caused by VOLUME control.	Replace VOLUME control.

a. Operational Check - Continued

(2) Using Optional Test Box and C-2297/VRC

This task covers the operational check of the C-2296/VRC using the optional test box and C-2297/VRC.

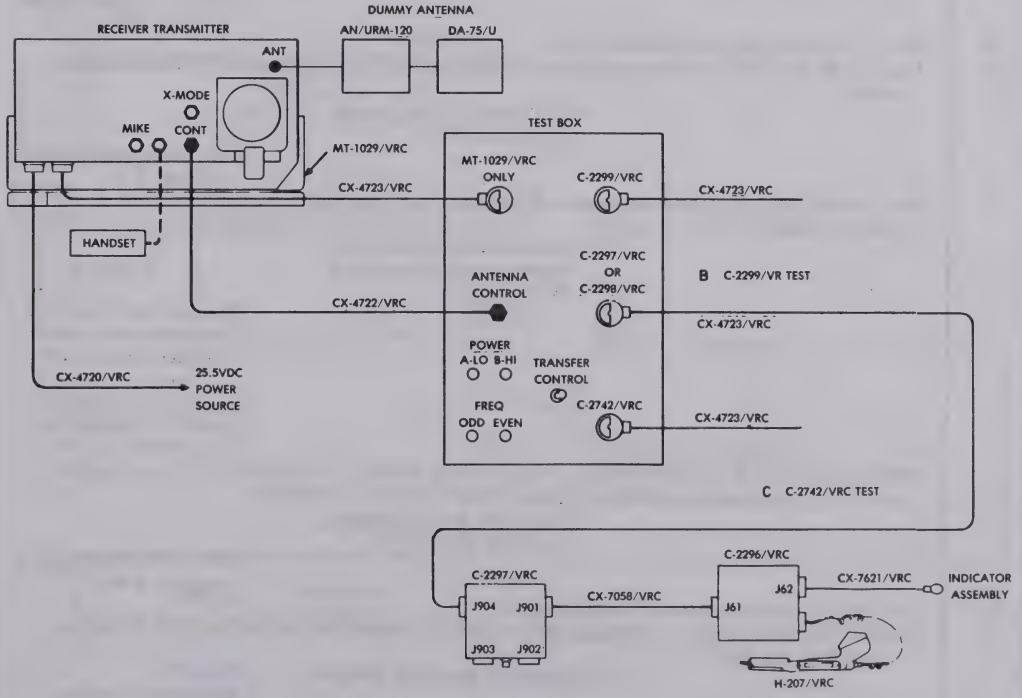
INITIAL SETUP

Test Equipment Required

Receiver-Transmitter, Radio RT-246(*)/VRC
or
Receiver-Transmitter, Radio RT-524(*)/VRC
Mounting MT-1029/VRC
Cable Assembly, Power, Electrical CX-4720/VRC
Cable Assemby, Special Purpose, Electrical CX-4723/VRC (2 ea)
Cable Assembly, RF CG-1773/U
Adapter, Connector UG-201
Control, Intercommunication Set C-2297/VRC
Power Supply PP-1104/G
Wattmeter AN/URM-120
Dummy Load, Electrical DA-75/U
Test box (fabrication instructions in appendix C)

Equipment Condition

Dummy antenna, wattmeter, power supply, mount, radio, C-2296/VRC, C-2297/VRC, and test box connected as shown.



a. Operational Check - Continued

(2) Using Optional Test Box and C-2297/VRC - Continued

Step	Operation	Normal indication	Corrective procedure
1	Turn on and adjust output of power supply to 25.5 V.		
2	Turn on receiver-transmitter. Adjust it to operate on any convenient frequency and note the low output transmission power.		
3	Set receiver-transmitter SQUELCH switch to NEW OFF.		
4	Set C-2297/VRC SIG-EXT-OFF switch to OFF.		
5	Set C-2296/VRC VOLUME control to midposition.		
6	Press H-207/VRC push-to-talk switch several times.	Lamps on both control boxes light each time.	Refer to troubleshooting actions, 2-5*b*.
7	Set C-2297/VRC SIG-EXT-OFF switch to SIG several times.	Lamps on both control boxes light each time.	Refer to troubleshooting actions, 2-6*b*.
8	Set C-2297/VRC SIG-EXT-OFF switch to EXT.	C-2296/VRC lamp goes out and C-2297/VRC light remains lighted.	Refer to troubleshooting actions, 2-6*b*.
9	Set C-2297/VRC MONITOR switch to A.		
10	Listen to H-207/VRC earphone while rotating C-2296/VRC VOLUME control throughtout its range.	Radio rushing noise, volume varying smoothly.	Refer to troubleshooting actions, 2-6*b*.
11	Press H-207/VRC push-to-talk switch; talk and listen for sidetone. (Intercom circuit test of C-2296/VRC).	Transmitter keyed, sidetone heard on loudspeaker and H-207/VRC.	If transmitter keyed but no sidetone is heard, replace module A80 (2-14c(2)). If transmitter is not keyed, refer to troubleshooting actions in 2-6*b*.
12	Hold C-2296/VRC RAD TRANS-INT switch to RAD TRANS, press H-207/VRC push-to-talk switch, talk and listen for sidetone. (Radio circuit test of C-2296/VRC.)	Transmitter keyed, sidetone heard on H-207/VRC.	Refer to troubleshooting actions, 2-6*b*.
13	Turn off power and disconnect test equipment.		
14	Set TS-352B/U to measure resistance RX1. Check continuity between E61 and J61-E and between E62 and J61-F.	Continuity should be obtained.	Repair faulty wiring.

a. Operational Check - Continued

(3) Using Optional Test Box and C-2298/VRC

This task covers the operational check of the C-2296/VRC using the optional test box and a C-2298/VRC.

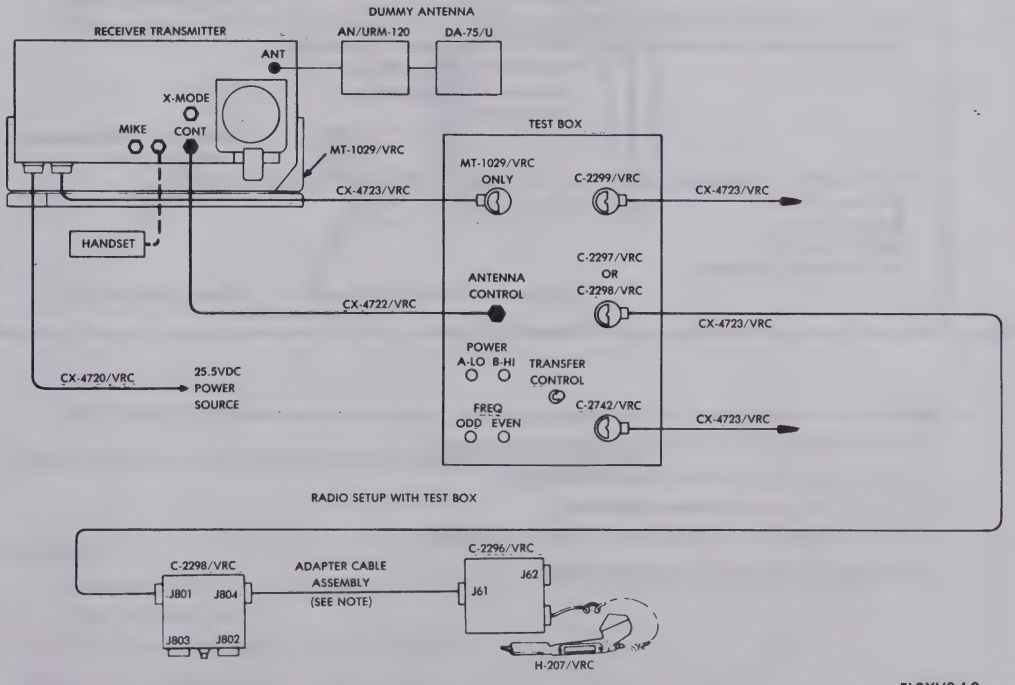
INITIAL SETUP

Test Equipment Required

Receiver-Transmitter, Radio RT-246(*)/VRC
or
Receiver-Transmitter, Radio RT-524(*)/VRC
Mounting MT-1029/VRC
Cable Assembly, Power, Electrical CX-4720/VRC
Cable Assembly, Special Purpose, Electrical CX-4723/VRC (2 ea)
Cable Assembly, RF CG-1773/U
Adapter, cable assembly (fabrication instructions in appendix C)
Adapter, Connector UG-201
Control, Intercommunication Set C-2298/VRC
Power Supply PP-1104/G
Wattmeter AN/URM-120
Dummy Load, Electrical DA-75/U
Test box (fabrication instructions in appendix C)

Equipment Condition

Dummy antenna, wattmeter, power supply, mount, radio, C-2296/VRC, C-2298/VRC, and test box connected as shown.



a. Operational Check - Continued

(3) Using Optional Test Box and C-2298/VRC - Continued

Step	Operation	Normal indication	Corrective procedure
1	Turn on and adjust output of power supply to 25.5 V.		
2	Turn on receiver-transmitter, adjust it to operate on any convenient frequency, and note low output transmission power.		
3	Set receiver-transmitter SQUELCH switch to NEW OFF.		
4	Rotate C-2296/VRC VOLUME control throughout its range, listen to H-207/VRC earphone. (C-2298/VRC MONITOR switch may be in any position.)	Radio rushing noise, volume varying smoothly.	Refer to troubleshooting actions, 2-6*b*.
5	Press H-207/VRC push-to-talk switch, talk and listen for sidetone.	Transmitter keyed, sidetone heard on loudspeaker and H-207/VRC. (Intercom circuit test of C-2296/VRC.)	If transmitter keyed but no sidetone is heard, replace module A80 (2-14*c*(2)). If transmitter is not keyed, refer to troubleshooting actions, 2-6*b*.
6	Hold H-207/VRC RAD TRANS-INT switch to RAD TRANS, press H-207/VRC push-to-talk switch, talk and listen for sidetone. (Radio circuit test of C-2296/VRC.)	Transmitter keyed and sidetone heard on loudspeaker and H-207/VRC.	Refer to troubleshooting actions, 2-6*b*.
7	Set TS-352B/U to measure resistance, RX1. Make the following continuity checks: E61 to J61-E E62 to J61-F J62-A to J61-D J62-B to J61-B	Continuity should be obtained.	Repair faulty wiring.

b. Inspection of Installed Items. Do the following anytime back cover is removed from C-2296/VRC:

(1) Inspect all sides of case for holes, dents, and gouges.

(2) Inspect inside of unit for general cleanliness.

(3) Inspect for loose or missing hardware.

(4) Inspect inside for damaged components or assemblies.

(5) Inspect for loose or broken connections.

2-14. C-2296/VRC MAINTENANCE – Continued

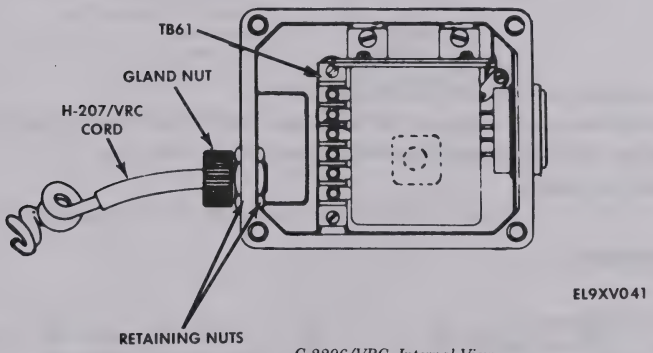
c. Removal and Replacement

(1) H-207/VRC

This task covers removal and replacement of H-207/VRC of the C-2296/VRC.	
INITIAL SETUP	
Tools	Materials/Parts
Tool Kit TS-100/G	Handset H-207/VRC SCDL415575 Silicone compound, item 7, appendix B, Masking tape, item 10, appendix B.

REMOVAL

1. Loosen four screws and remove back cover.
2. Loosen gland nut and two retaining nuts.
3. Use masking tape and mark five leads and their point of attachment to TB61.
4. Remove the five screws from TB61 and remove H-207/VRC and cord.



C-2296/VRC, Internal View

5. Remove gland nut and retaining hardware, noting the order of removal.

REPLACEMENT

1. Place gland nut and retaining hardware on H-207/VRC cord in the order noted during removal.
2. Attach the five leads to TB61.
3. Ensure that the rubber pad is in place on back cover.
4. Apply a light coating of silicone compound to preformed packing on back cover.
5. Replace back cover and tighten four hold-down screws.

c. Removal and Replacement - Continued

(2) Microphone Amplifier Assembly A80

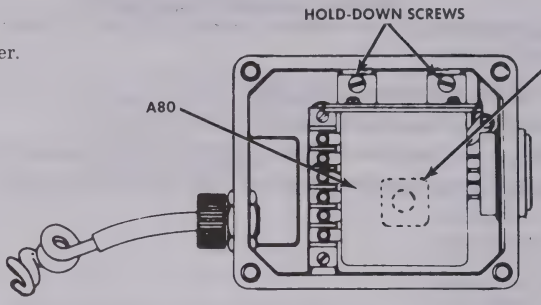
This task covers removal and replacement of microphone amplifier assembly A80 of C-2296/VRC.

INITIAL SETUP

Tools	Materials/Parts
Tool Kit TK-100/G	Microphone Amplifier Assembly A80 SMC415198 Silicone compound, item 7, appendix B.

REMOVAL

1. Loosen four screws and remove back cover.
2. Loosen two A80 hold-down screws.
3. Carefully remove A80 from receptacle.



C-2296/VRC, Internal View EL9XV042

REPLACEMENT

1. Ensure that rubber pads are attached to back cover, and stud on chassis.
2. Carefully line up pins on A80 with receptacle and press A80 into place. Tighten two hold-down screws.
3. Apply a light coating of insulating silicone compound to preformed packing on back cover.
4. Replace back cover and tighten four screws.

2-15. C-2297/VRC MAINTENANCE

a. Operational Check

(1) Without Optional Test Box

This task covers the operational check of C-2297/VRC.

INITIAL SETUP

Test Equipment Required

Power Supply PP-1104/G
Signal Generator AN/URM-127
Electronic Voltmeter ME-30(*)/U
Spectrum Analyzer TS-723(*)/U
Oscilloscope AN/USM-281A
Cable Assembly CG-1471/U
Test cable 1A (fabrication instructions in appendix C)
Test cable 2 (2 ea) (fabrication instructions in appendix C)
Test cable 5 (fabrication instructions in appendix C)
Resistor, 150 ohms, 2 watts (3 each)
Multimeter TS-352B/U

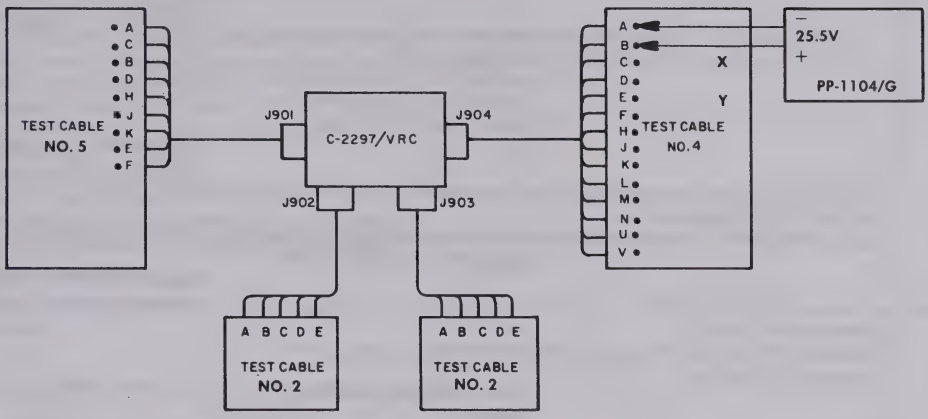
a. Operational Check - Continued

(1) Without Optional Test Box - Continued

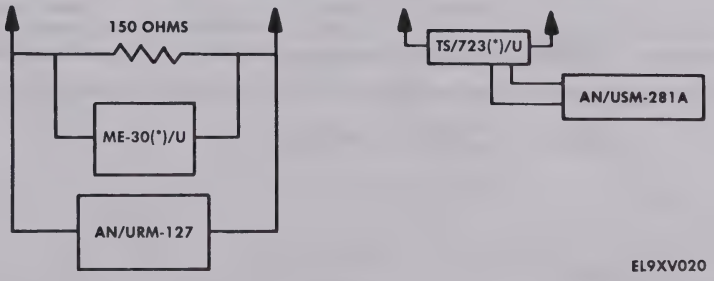
INITIAL SETUP - Continued

Equipment Conditions

Test cables and power supply connected to C-2297/VRC as shown.



Connect 150 ohm resistor, AN/URM-127, and ME-30(*)/U as shown.



Connect AN/USM-281A to TS-723(*)/U OSCILLOSCOPE terminals.

Connect a 150 ohm resistor between terminals K and A of test cable 1A.

Turn on PP-1104/G and set output for 25.5 V.

a. Operational Check - Continued

(1) Without Optional Test Box - Continued

Step	Operation	Normal indication	Corrective procedure
1	Set C-2297/VRC MONITOR switch to ALL and SIG-EXT-OFF switch to OFF.		
2	Connect AN/URM-127 to terminals D and A of test cable 2 connected to J902.		
3	Adjust output of AN/URM-127 to 1 kHz at 0.007 Vac.		
4	Adjust TS-723(*)/U to measure voltage and output between terminals K and A of test cable 1A.	Between 0.174 and 0.277 Vac.	Refer to troubleshooting actions, 2-7*b*.
5	Adjust TS-723(*)/U to measure distortion and connect between terminals K and A of test cable 1A. Also observe waveform on AN/USM-281A.	Less than 2% distortion on TS-723(*)/U and undistorted sine wave on AN/USM-281A.	Refer to troubleshooting actions, 2-7*b*.
6	Disconnect 150 ohm resistor from K and reconnect it to terminal V of test cable 1A.		
7	Set MONITOR switch to C.		
8	Adjust TS-723(*)/U to measure voltage and output between terminals V and A of test cable 1A.	Between 0.174 and 0.277 Vac.	Refer to troubleshooting actions, 2-7*b*.
9	Turn off PP-1104/G.		
10	Connect 150 ohm resistor across terminals B and A of test cable 5.		
11	Turn on PP-1104/G.	C-2297/VRC indicator lamp lights.	Refer to troubleshooting actions, 2-7*b*.
12	Set C-2297/VRC SIG-EXT-OFF switch to EXT.	C-2297/VRC indicator lamp lights.	Refer to troubleshooting actions, 2-7*b*.
13	Connect TS-352B/U to terminals C(+) and A (negative, ground) of test cable 5.	+25.5 V (power supply voltage).	Refer to troubleshooting actions, 2-7*b*.
14	Remove power, disconnect test equipment and return C-2297/VRC to operational condition.		

a. Operational Check - Continued

(2) Using Optional Test Box and C-2296/VRC

This task covers the operational check of the C-2297/VRC using the optional test box and C-2296/VRC.

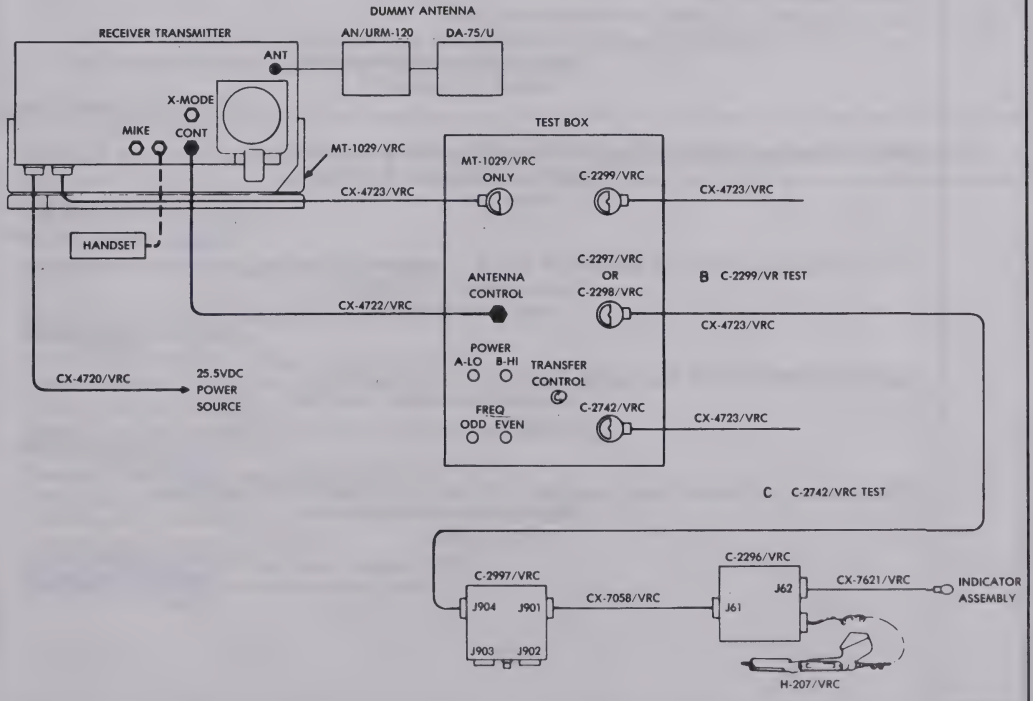
INITIAL SETUP

Test Equipment Required

Receiver-Transmitter, Radio RT-246(*)/VRC
or
Receiver-Transmitter, Radio RT-524(*)/VRC
Mounting MT-1029/VRC
Cable Assembly, Power, Electrical CX-4720/VRC
Cable Assembly, Special Purpose, Electrical CX-4723/VRC (2 ea)
Cable Assembly, RF CG-1773/U
Adapter, Connector UG-201
Control, Intercommunication Set C-2296/VRC
Power Supply PP-1104/G
Wattmeter AN/URM-120
Dummy Load, Electrical DA-75/U
Test box (fabrication instructions in appendix C)
Handset H189/GR, or similar audio accessory

Equipment Condition

Dummy antenna wattmeter, power supply, mount, radio, C-2296/VRC, C-2297/VRC, and test box connected as shown.



a. Operational Check - Continued

(2) Using Optional Test Box and C-2296/VRC - Continued

Step	Operation	Normal indication	Corrective procedure
1	Turn on and adjust output of power supply to 25.5 V.		
2	Turn on receiver-transmitter, adjust it to operate on any convenient frequency; note the low output transmission power.		
3	Set receiver-transmitter SQUELCH switch to NEW OFF.		
4	Set C-2297/VRC SIG-EXT-OFF switch to OFF.		
5	Set C-2296/VRC VOLUME control to midposition.		
6	Press H-207/VRC (connected to C-2296/VRC) push-to-talk switch several times.	Lamps on both control boxes light each time.	Refer to troubleshooting actions, 2-7*b*.
7	Set C-2297/VRC SIG-EXT-OFF switch to SIG several times.	Lamps on both control boxes light each time.	Refer to troubleshooting actions, 2-7*b*.
8	Set C-2297/VRC SIG-EXT-OFF switch to EXT.	C-2296 lamp goes out, C-2297/VRC light remains lighted.	Refer to troubleshooting actions, 2-7*b*.
9	Connect handset to J903.		
10	Set C-2297/VRC VOLUME control to midposition.		
11	Set C-2297/VRC MONITOR switch to each position, in turn, and listen to handset.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-7*b*.
12	Listen to handset and rotate VOLUME control throughout its range.	Radio rushing noise level varies smoothly.	Replace VOLUME control.
13	Connect handset to J902, set MONITOR switch to each position, in turn, and listen to hand set.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-7*b*.
14	Set MONITOR switch to ALL, press handset push-to-talk switch.	Receiver-transmitter should be keyed.	Refer to troubleshooting actions 2-7*b*.
15	With handset push-to-talk switch operated, talk into handset and listen for sidetone.	Sidetone heard in handset and on loudspeaker.	Replace microphone amplifier module A80 (2-15*d*).

a. Operational Check - Continued

(2) Using Optional Test Box and C-2296/VRC - Continued

Step	Operation	Normal indication	Corrective procedure
16	Connect handset to J903 and repeat step 15 for each position of the MONITOR switch.	Receiver-transmitter keyed, sidetone heard on handset and loudspeaker, each position.	Refer to troubleshooting actions 2-7*b*.
17	Set C-2297/VRC MONITOR switch to ALL.		
18	Press H-207/VRC (connected to C-2296/VRC) push-to-talk switch, talk into handset, and listen for sidetone.	Receiver-transmitter keyed, sidetone heard on H-207/VRC and loudspeaker.	Refer to troubleshooting actions, 2-7*b*.
19	Set C-2297/VRC MONITOR switch to A.		
20	Hold C-2296/VRC RAD TRANS-INT switch to RAD TRANS and repeat step 18.		

(3) Using Optional Test Box and C-2298/VRC

This task covers the operational check of the C-2297/VRC using the optional test box and a C-2298/VRC.

INITIAL SETUP

Test Equipment Required

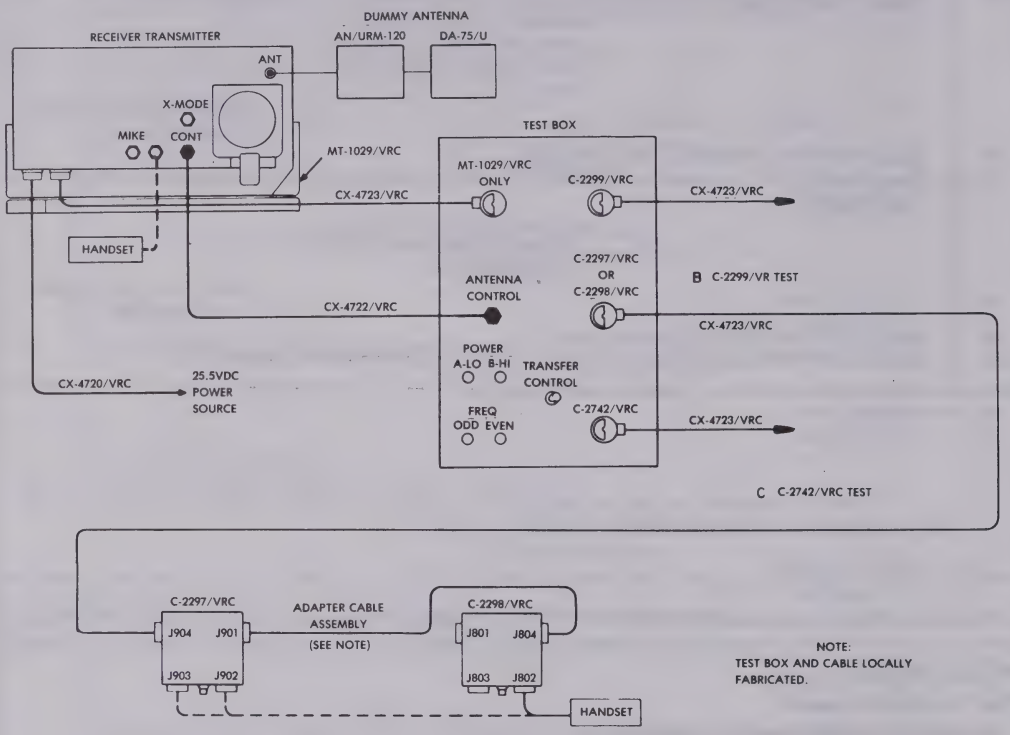
Receiver-Transmitter, Radio RT-246(*)/VRC
or
Receiver-Transmitter, Radio RT-524(*)/VRC
Mounting MT-1029/VRC
Cable Assembly, Power, Electrical CX-4720/VRC
Cable Assembly, Special Purpose, Electrical CX-4723/VRC (2 ea)
Cable Assembly, RF CG-1773/U
Adapter, cable assembly (fabrication instructions in appendix C)
Adapter, Connector UG-201
Control, Intercommunication Set C-2298/VRC
Power Supply PP-1104/G
Wattmeter AN/URM-120
Dummy Load, Electrical DA-75/U
Test box (fabrication instructions in appendix C)
Handset, H-189/GR, or similar audio accessory

a. Operational Check - Continued

(3) Using Optional Test Box and C-2298/VRC - Continued

Equipment Conditions

Dummy antenna, wattmeter, power supply, mount, radio C-2297/VRC, C-2298/VRC, and test box connected as shown.



Step	Operation	Normal indication	Corrective procedure
1	Turn on and output of power supply to 25.5 V.		
2	Turn on receiver-transmitter, adjust it to operate on any convenient frequency, and note the low output transmission power.		
3	Set receiver-transmitter SQUELCH switch to NEW OFF.		
4	Set C-2297/VRC SIG-EXT-OFF switch to EXT.	Lamp on C-2297/VRC should light.	Refer to troubleshooting actions, 2-7*b*.

a. Operational Check - Continued

(3) Using Optional Test Box and C-2298/VRC - Continued

Step	Operation	Normal indication	Corrective procedure
5	Set C-2297/VRC SIG-EXT-OFF switch to SIG several times.	Lamp on C-2297/VRC should light each time.	Refer to troubleshooting actions, 2-7*b*.
6	Connect handset to J903 of C-2297/VRC.		
7	Set C-2297/VRC VOLUME control to midposition.		
8	Set C-2297/VRC MONITOR switch to each position in turn and listen to handset.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-7*b*.
9	Listen to handset and rotate VOLUME control throughout its range.	Radio rushing noise level varies smoothly.	Replace VOLUME control.
10	Connect handset to J902, set MONITOR switch to each position in turn and listen to handset.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-7*b*.
11	Set C-2297/VRC MONITOR switch to ALL, press handset push-to-talk switch.	Receiver-transmitter should be keyed.	Refer to troubleshooting actions, 2-7*b*.
12	With handset push-to-talk switch operated, talk into handset and listen for sidetone.	Sidetone heard in handset and on loudspeaker	Replace microphone amplifier module A80 (2-15*c*).
13	Connect handset to J903 and repeat step 12 for each position of the MONITOR switch.	Receiver-transmitter keyed, sidetone heard in handset and on loudspeaker, each position.	Refer to troubleshooting actions, 2-7*b*.
14	Set C-2297/VRC MONITOR switch to A (SIG-EXT-INT at EXT).		
15	Connect handset to C-2298/VRC J803.		
16	Set C-2298/VRC MONITOR switch to A.		
17	Press H-189/U push-to-talk switch, talk into handset, and listen for sidetone.	Receiver-transmitter keyed, sidetone heard on handset and loudspeaker.	Refer to troubleshooting actions, 2-7*b*.

2-15. C-2297 MAINTENANCE – Continued

b. Inspection of Installed Items. Do the following anytime back cover is removed from C-2296/VRC.

(1) Inspect all sides of case for holes, dents, and gouges.

(2) Inspect inside of unit for general cleanliness.

(3) Inspect for loose or missing hardware.

(4) Inspect inside for damaged components or assemblies

(5) Inspect for loose or broken connections.

c. Removal and Replacement

This task covers removal and replacement of microphone amplifier assembly A80 of C-2297/VRC.

INITIAL SETUP

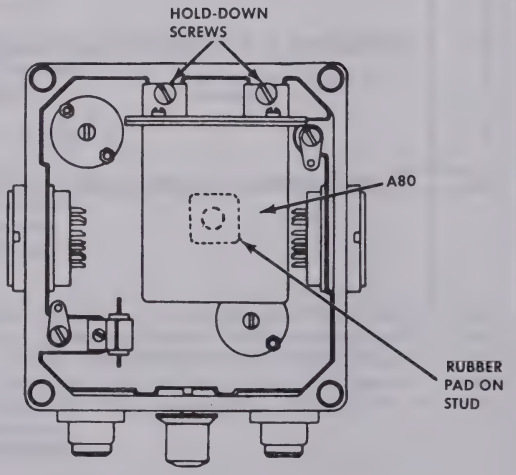
Tools	Materials/Parts
Tool Kit TK-100/G	Microphone Amplifier Assembly A80, SMC415198 Silicone compound, item 7, appendix B

REMOVAL

1. Loosen four captive screws and remove back cover.
2. Loosen two A80 hold-down screws.
3. Carefully remove A80.

REPLACEMENT

1. Ensure that rubber pads are in place over stud on chassis and on back cover.
2. Carefully line up pins on A80 with receptacle and press A80 into place. Tighten two hold-down screws.
3. Apply a light coating of insulating silicone compound to preformed packing on back cover.
4. Replace back cover and tighten four screws.



C-2297/VRC, Internal View

EL9XV046

2-16. C-2298/VRC MAINTENANCE

a. Operational Check

(1) Without Optional Test Box

This task covers the operational check of C-2298/VRC without the optional test box.

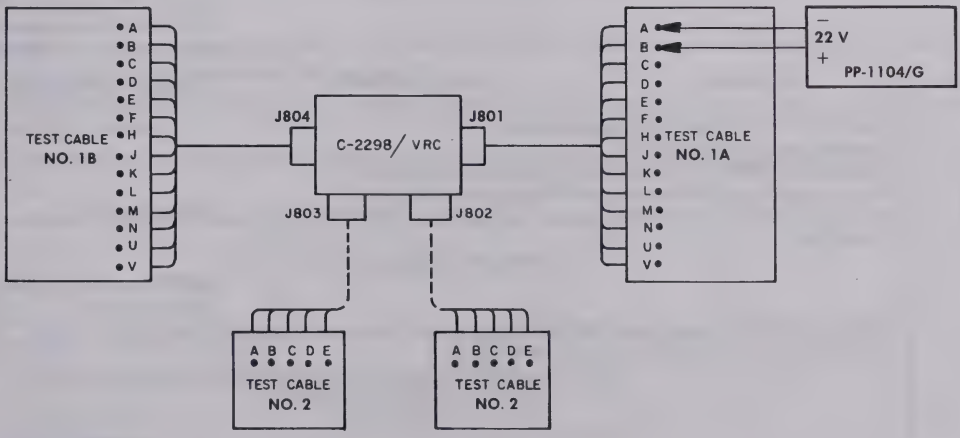
INITIAL SETUP

Test Equipment Required

Power Supply PP-1104/G
Signal Generator AN/URM-127
Electronic Voltmeter ME-30(*)/U
Spectrum Analyzer TS-723(*)/U
Oscilloscope AN/USM-281A
Cable Assembly CG-1471/U
Test cables 1A and 1B (fabrication instructions in appendix C)
Test cable 2 (fabrication instructions in appendix C)
150 ohm resistor, 2 watts (3 each)

Equipment Condition

Test cables and power supply connected to C-2298/VRC as shown.



EL9XV047

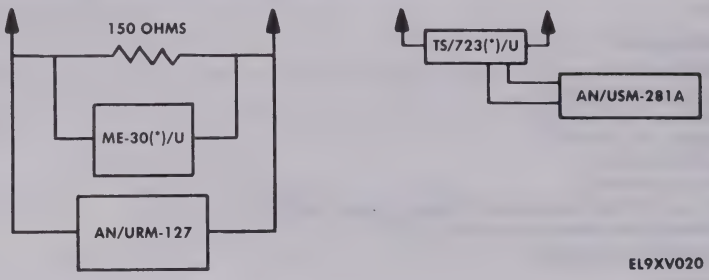
a. Operational Check - Continued

(1) Without Optional Test Box - Continued

INITIAL SETUP - Continued

Equipment Condition

Connect 150 ohm resistor AN/URM-127 and ME-30(*)/U as shown.



Connect AN/USM-281A to TS-723(*)/U OSCILLOSCOPE terminals.

Connect a 150 ohm resistor between terminals K and A of test cable 1A.

Turn on PP-1104/G and set output for 22 V.

Step	Operation	Normal indication	Corrective procedure
1	Set C-2298/VRC MONITOR switch to ALL.		
2	Connect test cable 2 to J802.		
3	Connect AN/URM-127 to terminals D and A of test cable 2.		
4	Adjust output of AN/URM-127 to 500 Hz at 0.007 V.		
5	Adjust TS-723(*)/U to measure voltage and measure output between terminals K and A of test cable 1A.	Between 0.174 and 0.277 Vac.	Refer to troubleshooting actions, 2-8*b*.
6	Adjust TS-723(*)/U to measure distortion and connect between terminals K and A of test cable 1A. Also observe waveform on AN/USM-281A.	Less than 2% distortion on TS-723(*)/U and undistorted sine wave on AN/USM-281A.	Refer to troubleshooting actions, 2-8*b*.
7	Adjust output of AN/URM-127 to 1 kHz at 0.007 V and repeat measurements in steps 5 and 6.		
8	Adjust output of PP-1104/G to 25.5 V and 30.0 V, in turn, and repeat measurements in steps 5 and 6.		
9	Change connection of test cable 2 to J803.		
10	Set MONITOR switch to A, INT ONLY and B. Repeat voltage measurement in step 5 for each position.		
11	Disconnect 150 ohm resistor from K and reconnect it to terminal V of test cable 1A.		

a. Operational Check - Continued

(1) Without Optional Test Box - Continued

Step	Operation	Normal indication	Corrective procedure
12	Set MONITOR switch to C.		
13	Adjust TS-723(*) to measure voltage and measure output between terminals V and A of test cable 1A.	Between 0.174 and 0.277 Vac.	Refer to troubleshooting actions, 2-8*b*.
14	Remove power, disconnect test equipment and return C-2298/VRC to operational condition.		

(2) Using Optional Test Box

This task covers the operational check of the C-2298/VRC using the optional test box.

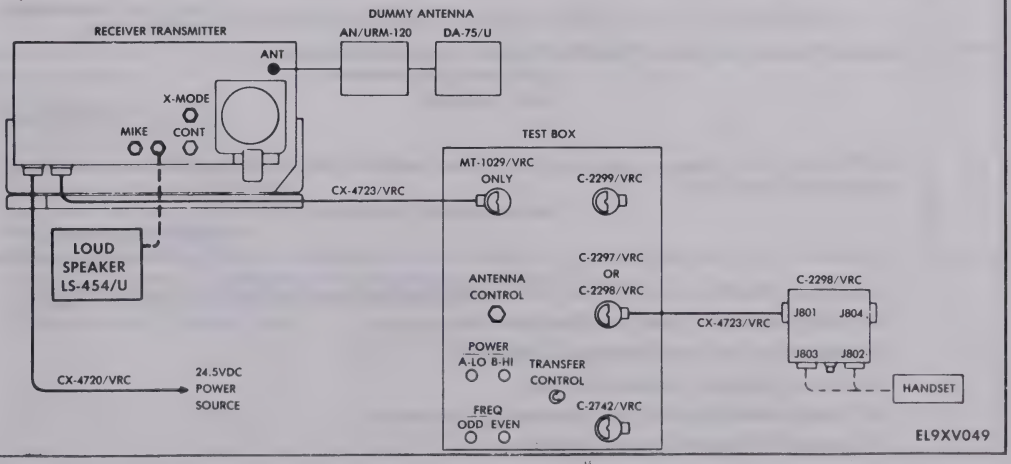
INITIAL SETUP

Test Equipment Required

Receiver-Transmitter, Radio RT-246(*)/VRC
or
Receiver-Transmitter, Radio RT-524(*)/VRC
Mounting MT-1029/VRC
Cable Assembly, Power, Electrical CX-4720/VRC
Cable Assembly, Special Purpose, Electrical CX-4723/VRC (2 ea)
Cable Assembly, RF CG-1773/U
Adapter, Connector UG-201
Handset H-189/GR, or similar audio accessory
Power Supply PP-1104/G
Wattmeter AN/URM-120
Dummy Load, Electrical DA-75/U
Test box (fabrication instructions in appendix C)
Multimeter TS-352B/U

Equipment Condition

Dummy antenna, wattmeter, power supply, mount, radio, C-2298/VRC, and test box connected as shown.



a. Operational Check - Continued

(2) Using Optional Test Box - Continued

Step	Operation	Normal indication	Corrective procedure
1	Turn on and adjust output of the power supply to 25.5 V.		
2	Turn on receiver-transmitter, adjust it to operate on any convenient frequency, and note the low output transmission power.		
3	Set receiver-transmitter SQUELCH switch to NEW OFF.		
4	Set C-2298/VRC VOLUME control to midposition.		
5	Connect handset to J803.		
6	Set C-2298/VRC MONITOR switch to each position in turn and listen to handset.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-8*b*.
7	Connect handset to J802.		
8	Set C-2298/VRC MONITOR switch to each position in turn and listen to handset.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-8*b*.
9	Set C-2298/VRC MONITOR switch to ALL.		
10	Press handset push-to-talk switch.	Receiver-transmitter should be keyed.	Refer to troubleshooting actions, 2-8*b*.
11	With handset push-to-talk switch operated, talk into handset and listen for sidetone.	Sidetone heard in handset and on loudspeaker.	Replace microphone amplifier module A80 (2-16*c*).
12	Connect handset to J803 and repeat steps 11 and 12 for each position of MONITOR switch.	Receiver-transmitter keyed, sidetone heard on handset and loudspeaker at each position.	Refer to troubleshooting actions, 2-8*b*.
13	Listen to handset and rotate VOLUME control throughout its range.	Radio rushing noise should vary smoothly.	Replace VOLUME control.
14	Set TS-352B/U to measure resistance, RX1. Make continuity checks between J803N and J804N, then J803U and J804U.	Continuity should be obtained.	Repair faulty wiring.

b. Inspection of Installed Items. Do the following anytime back cover is removed from C-2298/VRC.

(1) Inspect all sides of case for holes, dents, and gouges.

(2) Inspect inside of unit for general cleanliness.

(3) Inspect for loose or missing hardware.

(4) Inspect inside for damaged components or assemblies.

(5) Inspect for loose or broken connections.

2-16. C-2298 MAINTENANCE – Continued

c. Removal and Replacement

This task covers removal and replacement of microphone amplifier assembly A80 of C-2298/VRC.

INITIAL SETUP

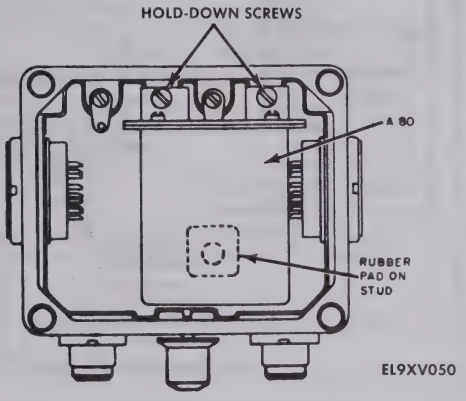
Tools	Materials/Parts
Tool Kit TK-100/G	Microphone Amplifier Assembly A80 SMC415198 Silicone compound, item 7, appendix B

REMOVAL

1. Loosen four captive screws and remove back cover.
2. Loosen two A80 hold-down screws.
3. Carefully remove A80.

REPLACEMENT

1. Ensure that rubber pads are in place over stud on chassis and on back cover.
2. Carefully line up pins on A80 with receptacle and press A80 into place. Tighten two hold-down screws.
3. Apply a light coating of insulating silicone compound to preformed packing on back cover.
4. Replace back cover and tighten four screws.



C-2298/VRC, Internal View

2-17. C-10456/VRC MAINTENANCE

a. Operational Check

(1) Without Optional Test Box

This task covers the operational check of C-10456/VRC without the optional test box.

INITIAL SETUP

Test Equipment Required

Power Supply PP-1104/G
Signal Generator AN/URM-127
Electronic Voltmeter ME-30(*)/U
Spectrum Analyzer TS-723(*)/U
Oscilloscope AN/USM-281A
Cable Assembly CG-1471/U
Test cables 1A and 1B (fabrication instructions in appendix C)
Test cable 2 (fabrication instructions in appendix C)
150 ohm resistor, 2 watts (3 each)

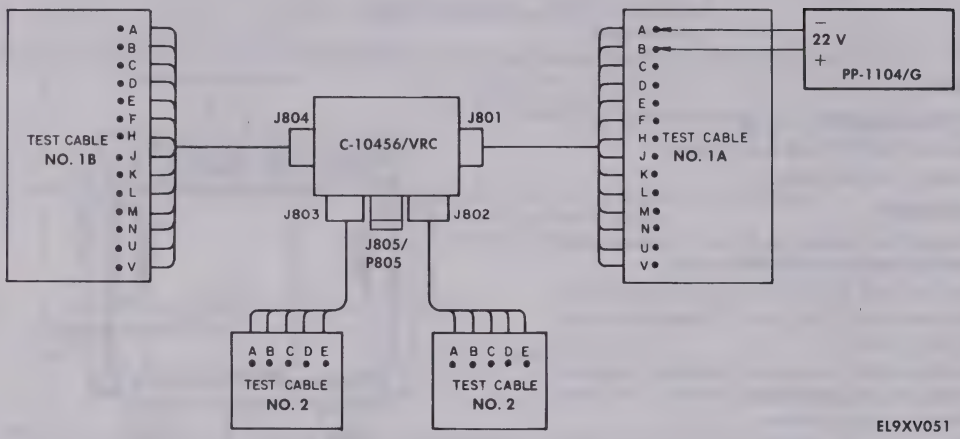
a. Operational Check - Continued

(1) Without Optional Test Box - Continued

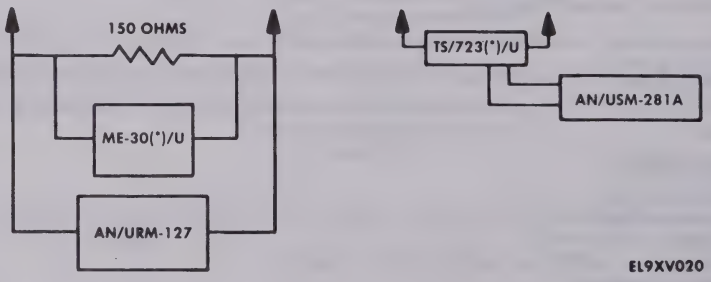
INITIAL SETUP - Continued

Equipment Condition

Test cables and power supply connected to C-10456/VRC as shown.



Connect 150 ohm resistor, AN/URM-127, and ME-30(*)/U as shown.



Connect AN/USM-281A to TS-723(*)/U OSCILLOSCOPE terminals.

Connect a 150 ohm resistor between terminals K and A of test cable 1A.

Turn on PP-1104/G and set output for 22 V.

Connect dummy plug P805 to J805.

a. Operational Check - Continued

(1) Without Optional Test Box - Continued

Step	Operation	Normal indication	Corrective procedure
1	Set C-10456/VRC MONITOR switch to ALL.		
2	Connect test cable 2 to J802.		
3	Connect AN/URM-127 to terminals D and A of test cable 2.		
4	Adjust output of AN/URM-127 to 500 Hz at 0.007 V.		
5	Adjust TS-723(*)/U to measure voltage and measure output between terminals K and A of test cable 1A.	Between 0.174 and 0.277 Vac.	Refer to troubleshooting actions, 2-9*b*.
6	Adjust TS-723(*)/U to measure distortion and connect between terminals K and A of test cable 1A. Also observe waveform on AN/USM-281A.	Less than 2% distortion on TS-723(*)/U and undistorted sine wave on AN/USM-281A.	Refer to troubleshooting actions, 2-9*b*.
7	Adjust output of AN/URM-127 to 1 kHz at 0.007 V and repeat measurements in steps 5 and 6.		
8	Adjust output of PP-1104/G to 25.5 V and 30.0 V in turn and repeat measurements in steps 5 and 6.		
9	Change connection of test cable 2 J803.		
10	Set MONITOR switch to A, INT ONLY, and B. Repeat voltage measurement in step 5 for each position.		
11	Disconnect 150 ohm resistor from K and reconnect it to terminal V of test cable 1A.		
12	Set MONITOR switch to C.		
13	Adjust TS-723(*) to measure voltage and measure output between terminals V and A of test cable 1A.	Between 0.174 and 0.277 Vac.	Refer to troubleshooting actions, 2-9*b*.
14	Remove power, disconnect test equipment and return C-10456/VRC to operational condition.		

(2) Using Optional Test Box

This task covers the operational check of the C-10456/VRC using the optional test box.

INITIAL SETUP

Test Equipment Required

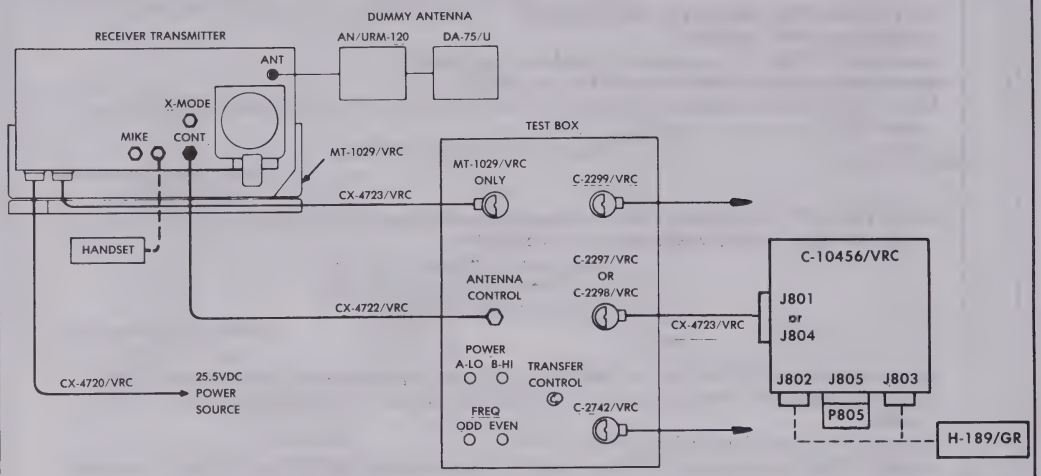
Receiver-Transmitter, Radio RT-246(*)/VRC
or
Receiver-Transmitter, Radio RT-524(*)/VRC
Mounting MT-1029/VRC
Cable Assembly, Power, Electrical CX-4720/VRC
Cable Assembly, Special Purpose, Electrical CX-4723/VRC (2 ea)
Cable Assembly, RF CG-1773/U
Adapter, Connector UG-201
Handset H-189/GR, or similar audio accessory
Power Supply PP-1104/G
Wattmeter AN/URM-120
Dummy Load, Electrical DA-75/U
Test box (fabrication instructions in appendix C)
Multimeter TS-352B/U

a. Operational Check - Continued

(2) Using Optional Test Box - Continued

Equipment Condition

Dummy antenna, wattmeter, power supply, mount, radio, C-10456/VRC, and test box connected as shown.



Step	Operation	Normal indication	Corrective procedure
1	Set TS-352B/U to measure resistance, RX1. Check continuity between pins 1 and 2 of dummy plug P805.	Continuity should be obtained.	Repair dummy plug.
2	Connect dummy plug P805 to J805.		
3	Turn on PP-1104/G and set output to 25.5 Vdc.		
4	Turn on receiver-transmitter, adjust it to operate on any convenient frequency, and note the low output power.		
5	Set receiver-transmitter SQUELCH switch to NEW OFF.		
6	Connect handset to J803.		
7	Set C-10456/VRC volume control to midposition.		
8	Set C-10456/VRC MONITOR switch to each position in turn and listen to handset.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-9*b*.
9	Listen to handset and rotate C-10456/VRC VOLUME control throughout its range.	Radio rushing noise level varies smoothly.	Replace VOLUME control.
10	Connect handset to J802.		

a. Operational Check - Continued

(2) Using Optional Test Box - Continued

Step	Operation	Normal indication	Corrective procedure
11	Set MONITOR switch to each position in turn and listen to handset.	Radio rushing noise should be heard at each position.	Refer to troubleshooting actions, 2-9*b*.
12	Set MONITOR switch to ALL.		
13	Press handset push-to-talk switch.	Receiver-transmitter should be keyed.	Refer to troubleshooting actions, 2-9*b*.
14	With handset push-to-talk switch operated, talk into handset and listen for sidetone.	Sidetone should be heard on handset and loudspeaker.	Refer to troubleshooting actions, 2-9*b*.
15	Connect handset to J803 and repeat steps 13 and 14 for each position of MONITOR switch.	Receiver-transmitter keyed, sidetone heard on handset, and loudspeaker at each position.	Refer to troubleshooting actions, 2-9*b*.
16	Turn off power and disconnect C-10456/VRC from test setup.		
17	Set TS-352B/U to measure resistance RX1. Check continuity between J803-N and J804-N, then between J803-U and J804-U.	Continuity should be obtained.	Repair faulty wiring.

b. Inspection of Installed Items. Do the following anytime back cover is removed from C-10456/VRC.

(1) Inspect all sides of case for holes, dents, and gouges.

(2) Inspect inside of unit for general cleanliness.

(3) Inspect for loose or missing hardware.

(4) Inspect inside for damaged components or assemblies.

(5) Inspect for loose or broken connections.

c. Removal and Replacement

(1) Microphone Amplifier Assembly A80

This task covers removal and replacement of microphone amplifier assembly A80 of C-10456/VRC.

INITIAL SETUP

Tools	Material/Parts
Tool Kit TK-100/G	Microphone Amplifier Assembly A80 SMC415198 Silicone compound, item 7, appendix B

c. *Removal and Replacement* - Continued

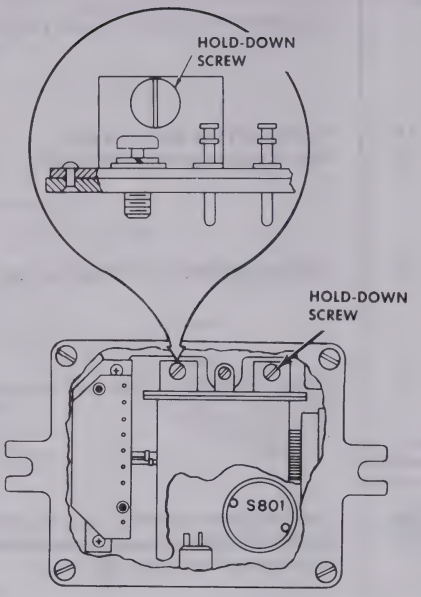
(1) Microphone Amplifier Assembly A80 – Continued

REMOVAL

1. Remove four screws and lift off back cover.
2. Loosen two hold-down screws.
3. Carefully remove module A80.

REPLACEMENT

1. Ensure that rubber pad is connected to stud under the A80 module and on back cover.
2. Position replacement module pins in line with the receptacle.
3. Press module in place.
4. Tighten two hold-down screws.
5. Apply a light coating of insulating silicone compound to preformed packing on back cover.
6. Replace back cover and tighten four screws.



EL9XV053

C-10456/VRC, Internal View

(2) Circuit Card Assembly A81.

This task covers removal and replacement of circuit card assembly A81 of C-10456/VRC.	
INITIAL SETUP	
Tools	Materials/Parts
Tool Kit TK-100/G	Circuit Card Assembly A81 B4001099 Silicone compound, item 7, appendix B, Masking tape, item 10, appendix B.

REMOVAL

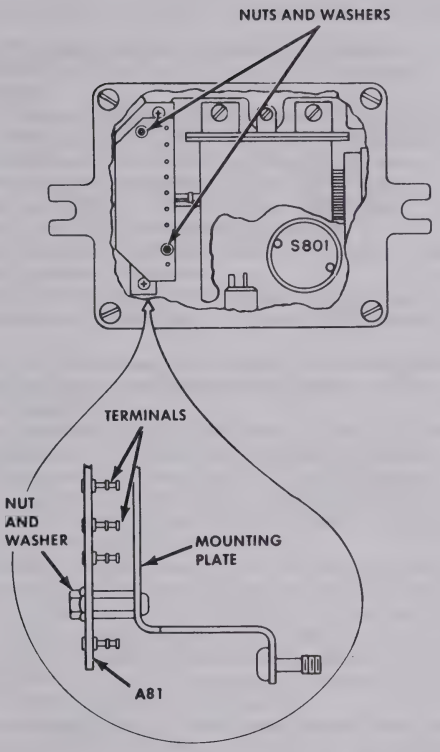
1. Loosen four screws and remove back cover.
2. Remove two nuts and washers holding A81 in place.
3. Lift the A81 out of C-10456/VRC as far as possible.
4. Use masking tape and mark the eight leads for reconnection.
5. Unsolder the eight leads from A81 terminals.

c. *Removal and Replacement* - Continued

(2) Circuit Card Assembly A81 – Continued

REPLACEMENT

1. Resolder the eight leads to the A81 terminals.
2. If necessary, tighten the two mounting screws, then place the A81 over them.
3. Replace the two nuts and washers and tighten them.
4. Check to see that the rubber pad is attached to the back cover.
5. Apply a light coat of insulating silicone compound to preformed packing on back cover.
6. Replace back cover and tighten four captive screws.



C-10456/VRC, Internal View

EL9XV054

APPENDIX A

REFERENCES

AR 55-38	Reporting of Transportation Discrepancies in Shipments (NAVSUPINST 4610-33C; AFR 74-18; MCO P4610-19D; DLAR 4500-15).
AR 735-11-2	Reporting of Item and Packaging Discrepancies (DLAR 4140-55; NAVMATINST 4355-73A; AFR 400-54; MCO 4430 3F).
DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
DA Pam 738-750	The Army Maintenance Management System (TAMMS).
DA Pam 750-10	US Army Equipment Index of Modification Work Orders.
SB 11-131	Vehicular Radio Sets and Authorized Installations.
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 11-624	Warning Notice for Vehicles in Which Radios Are Mounted.
TB 385-4	Safety Precautions for Maintenance of Electrical/Electronic Equipment.
TB 43-0118	Field Instructions for Painting and Preserving Electronic Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 10-8400-201-23	Organizational and Direct Support Maintenance Manual: General Repair Procedures for Clothing and Individual Equipment.
TM 11-5815-332-15	Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual Radio Teletypewriter Set AN/VSC-3 (NSN 5815-00-224-8130) and AN/VSC-3A (5815-01-102-5916) (Reprinted W/Basic incl C1-10).
TM 11-5820-401-20-2	Organizational Maintenance Manual for Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435) and AN/VRC-49 (5820-00-223-7437) (Used W/ Intercom System AN/VIC-1(V)) [EE 150-JA-MMD-020/E154-VRC-12, 43].
TM 11-5820-498-12	Operator's and Organizational Maintenance Manual Radio Sets AN/VRC-53 (NSN 5820-00-223-7467), AN/VRC-64 (5820-00-223-7475), AN/GRC-125 (5820-00-223-7411) and AN/GRC-160 (5820-00-223-7473), and Amplifier Power Supply Groups CA-3633/GRC and OA-3633A/GRC (5820-00-973-3383) (Reprinted W/Basic incl C1-9).
TM 11-5820-667-12	Operator's and Organizational Maintenance Manual Radio Set AN/PRC-77 (NSN 5820-00-930-3724) (Including Receiver-Transmitter Radio RT-841/PRC-77) (5820-00-930-3725) (Reprinted W/Basic Incl C1-8).
TM 11-5830-340-12	Operator's and Organizational Maintenance Manual Intercommunications Set AN/VIC-1(V) Controls, Intercommunications Set C-10456/VRC (NSN 5830-01-082-0804) C-10680/VRC and Amplifier, Audio Frequency, AM-7046/VRC (Reprinted W/Basic Incl C1-3).
TM 11-5965-255-14P	Operator, Organizational, Direct Support, General Support and Depot Maintenance Repair Parts and Special Tools Lists: Loudspeaker, Permanent Magnet LS-454/U (NSN 5965-00-892-3538).
TM 11-5965-260-24P	Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools) for Headset, Electrical H-140A/U (NSN 5965-00-892-1010).

TM 11-5965-262-13	Organizational and Direct Support Maintenance Manual (Including Repair Parts and Special Tools Lists): Headset-Microphone H-161/U and H-161A/U (NSN 5965-00-082-4037 and 5965-00-824-4871).
TM 11-5965-280-15	Operator's Organizational, Direct Support, General Support and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Handset H-189/GR (NSN 5965-00-069-8886).
TM 11-5965-282-15	Organizational, Direct Support, General Support and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Headset-Microphone Kit MK-1039/G (Reprinted W/Basic Incl C1-2).
TM 11-5965-286-14	Operator's, Organizational, Direct Support and General Support Maintenance Manual: Headset-Microphone Kit MK-1697/G (NSN 5965-00-313-8958).
TM 11-6130-246-12	Operator's and Organizational Maintenance Manual: Power Supply PP-1104/G (NSN 6130-00-542-6385) (With Instructions for Use as a Battery Charger).
TM 11-6625-255-14	Operator, Organizational, Direct Support and General Support Maintenance Manual: Spectrum Analyzer TS-723A/U, TS-723B/U, TS-723C/U and TS-723D/U (NSN 6625-00-668-9418) [TO 33A1-13-170-1] (Reprinted W/Basic incl C1).
TM 11-6625-320-12	Operator and Organizational Maintenance Manual: Voltmeter ME-30A/U, and Voltmeters, Electronic ME-30B/U, ME-30C/U, and ME-30E/U.
TM 11-6625-366-15	Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual: Multimeter TS-352B/U (NSN 6625-00-553-0142).
TM 11-6625-446-15	Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual: Wattmeter AN/URM-120 (NSN 6625-00-813-8430).
TM 11-6625-683-15	Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual: Signal Generator AN/URM-127 (NSN 6625-00-783-5965).
TM 11-6625-1703-15	Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual: Oscilloscope AN/USM-281A (NSN 6625-00-228-2201).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the (AN/VIC-1(V). These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

B-2. Explanation of Columns

a. Column 1 – Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, app. D").

b. Column 2 – Level. This column identifies the lowest level of maintenance that requires the listed item.

C – Operator/Crew
O – Organizational Maintenance/Aviation Unit Maintenance
F – Direct Support Maintenance/Aviation Intermediate Maintenance
H – General Support Maintenance

c. Column 3 – National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 – Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by a part number.

e. Column 5 – Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

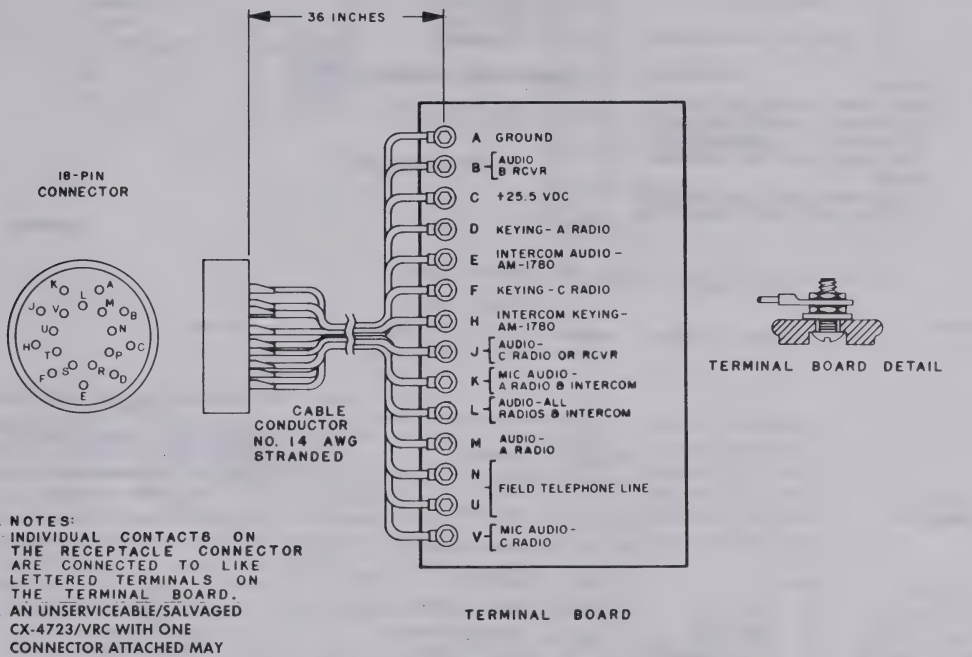
Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item no.	(2) Level	(3) National stock number	(4) Description Part no. and FSCM	(5) Unit of measure
1	F	5905-00-119-3505	Resistor, Fixed Composition: 68,000 ±10% RC07GF683K (81349)	each
2	F	5905-00-683-2243	Resistor, Fixed Composition: 150 ±10% RC07GF151J (81349)	each
3	F	5905-00-683-7721	Resistor, Fixed Composition: 100 ±10% RC07GF101J (81349)	each
4	F	5905-01-039-2981	Resistor, Fixed Composition: 600 ±10% RC42GF601G (81349)	each
5	F	9150-00-145-0161	Grease, Aircraft/Instrument: 8 oz MIL-G-46886/DC33LIGHT (81349/71984)	tube
6	F	8040-01-013-0133	Silicone Sealant: 8 oz DC 738RTV (71984)	tube
7	F	6850-00-880-7616	Silicone Compound: 8 oz MILS8660/DC4 (81349/71984)	tube
8	C	6850-00-105-3084	Trichlorotrifluoroethane (81346)	quart
9	C	8305-00-205-3496	Cloth, Cheesecloth CCC-C-440 (81348)	yard
10	F	7510-00-290-2023	Tape, Pressure Sensitive (81348)	roll

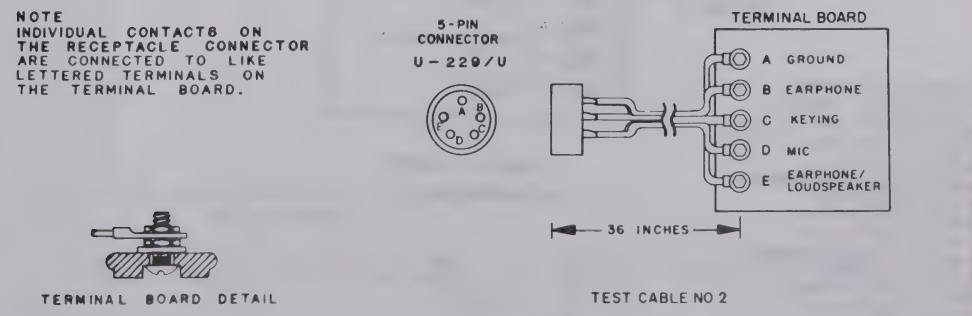
APPENDIX C

ILLUSTRATED LIST OF MANUFACTURED ITEMS

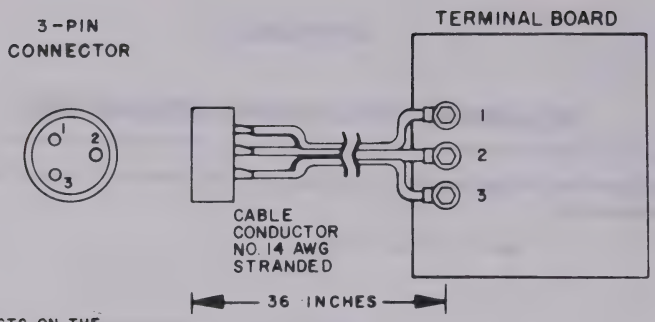
This appendix includes complete instructions for making items authorized to be manufactured or fabricated at direct support maintenance.


36 INCHES
18-PIN CONNECTOR
A GROUND
B AUDIO B RCVR
C +25.5 VDC
D KEYING - A RADIO
E INTERCOM AUDIO - AM-1780
F KEYING - C RADIO
H INTERCOM KEYING - AM-1780
J AUDIO - C RADIO OR RCVR
K MIC AUDIO - A RADIO & INTERCOM
L AUDIO - ALL RADIOS & INTERCOM
M AUDIO - A RADIO
N FIELD TELEPHONE LINE
U
V MIC AUDIO - C RADIO
CABLE CONDUCTOR NO. 14 AWG STRANDED
TERMINAL BOARD DETAIL
TERMINAL BOARD
1. NOTES:
INDIVIDUAL CONTACTS ON THE RECEPTACLE CONNECTOR ARE CONNECTED TO LIKE LETTERED TERMINALS ON THE TERMINAL BOARD.
2. AN UNSERVICEABLE/SALVAGED CX-4723/VRC WITH ONE CONNECTOR ATTACHED MAY BE USED FOR TEST CABLES 1A AND 1B.
EL9XV055

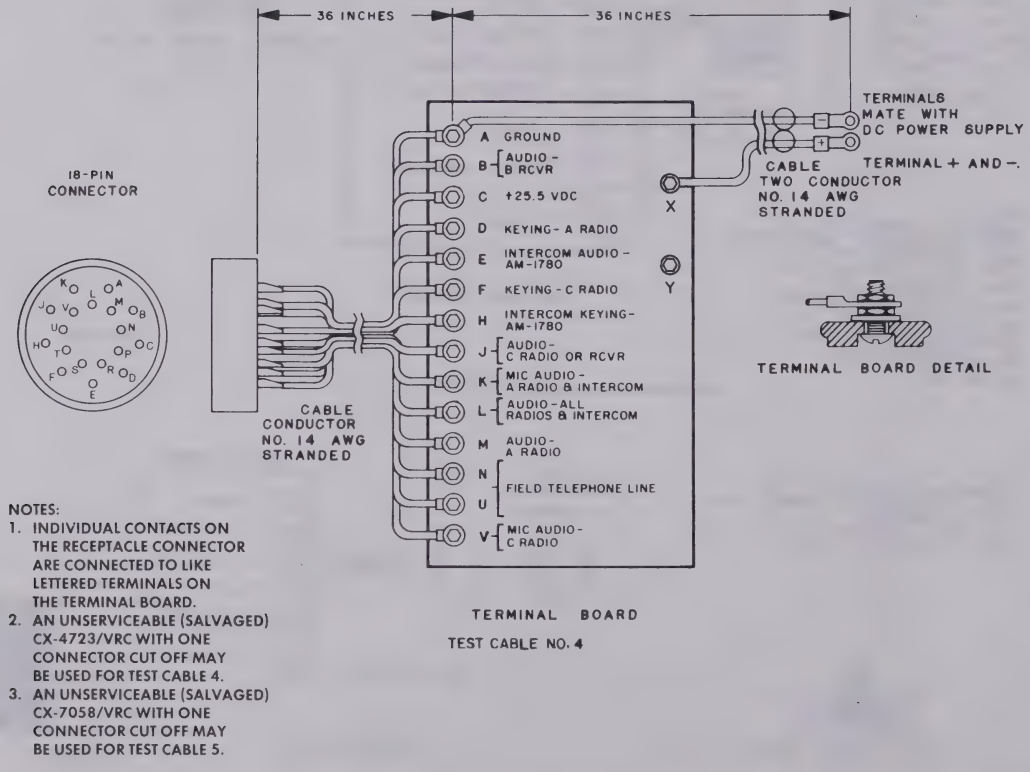
Test Cables 1A and 1B, Fabrication Details



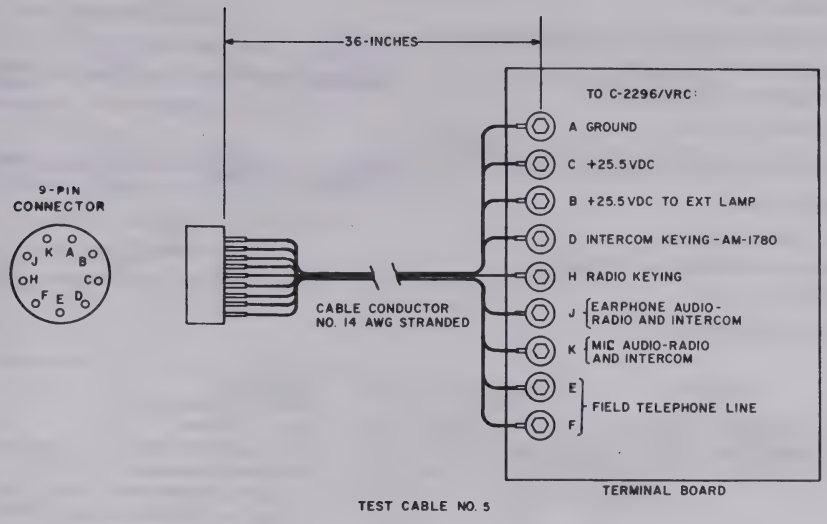
Test Cable 2, Fabrication Details



Test Cable 3, Fabrication Details


36 INCHES
36 INCHES
TERMINALS
MATE WITH
DC POWER SUPPLY
TERMINAL + AND -.
CABLE
TWO CONDUCTOR
NO. 14 AWG
STRANDED
18-PIN
CONNECTOR
A GROUND
B AUDIO - B RCVR
C +25.5 VDC
D KEYING - A RADIO
E INTERCOM AUDIO - AM-1780
F KEYING - C RADIO
H INTERCOM KEYING - AM-1780
J AUDIO - C RADIO OR RCVR
K MIC AUDIO - A RADIO & INTERCOM
L AUDIO - ALL RADIOS & INTERCOM
M AUDIO - A RADIO
N FIELD TELEPHONE LINE
U FIELD TELEPHONE LINE
V MIC AUDIO - C RADIO
X
Y
TERMINAL BOARD DETAIL
CABLE
CONDUCTOR
NO. 14 AWG
STRANDED
TERMINAL BOARD
TEST CABLE NO. 4
NOTES:
1. INDIVIDUAL CONTACTS ON THE RECEPTACLE CONNECTOR ARE CONNECTED TO LIKE LETTERED TERMINALS ON THE TERMINAL BOARD.
2. AN UNSERVICEABLE (SALVAGED) CX-4723/VRC WITH ONE CONNECTOR CUT OFF MAY BE USED FOR TEST CABLE 4.
3. AN UNSERVICEABLE (SALVAGED) CX-7058/VRC WITH ONE CONNECTOR CUT OFF MAY BE USED FOR TEST CABLE 5.
EL9XV058

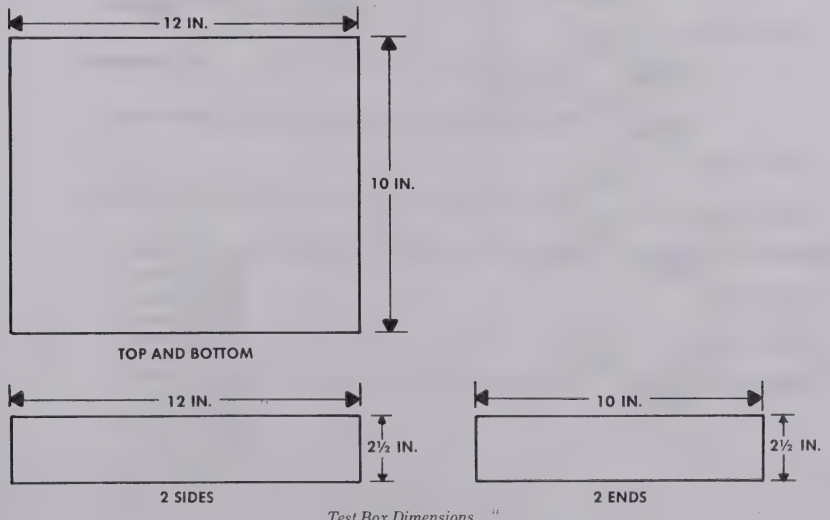
Test Cable 4, Fabrication Details



Test Cable 5, Fabrication Details

Items Required for Test Box Fabrication:

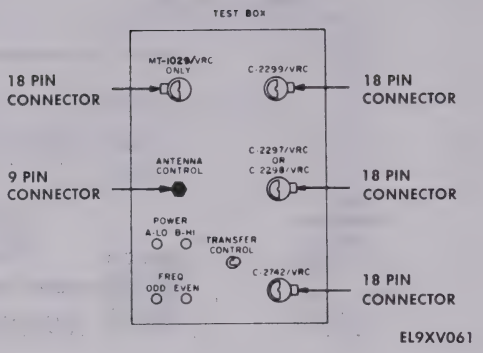
Socket, relay	5935-01-139-0874
Indicator assembly, light, indicator (4 ea)	6120-00-882-3615
Lamp, incandescent (type MS-25237-327) (4 ea)	6240-00-155-7836
Relay, electromagnetic	5945-00-823-2666
Connector, receptacle, electrical, 18 contacts, female (4 ea)	5935-00-133-0394
Connector, receptacle, electrical, 9 contacts, female	5935-00-892-8895
Toggle switch, single pole, three position	--
Metal box, fabricated as shown (10 in. wide; 12 in. long; 2½ in. deep; protective cover on bottom)	--

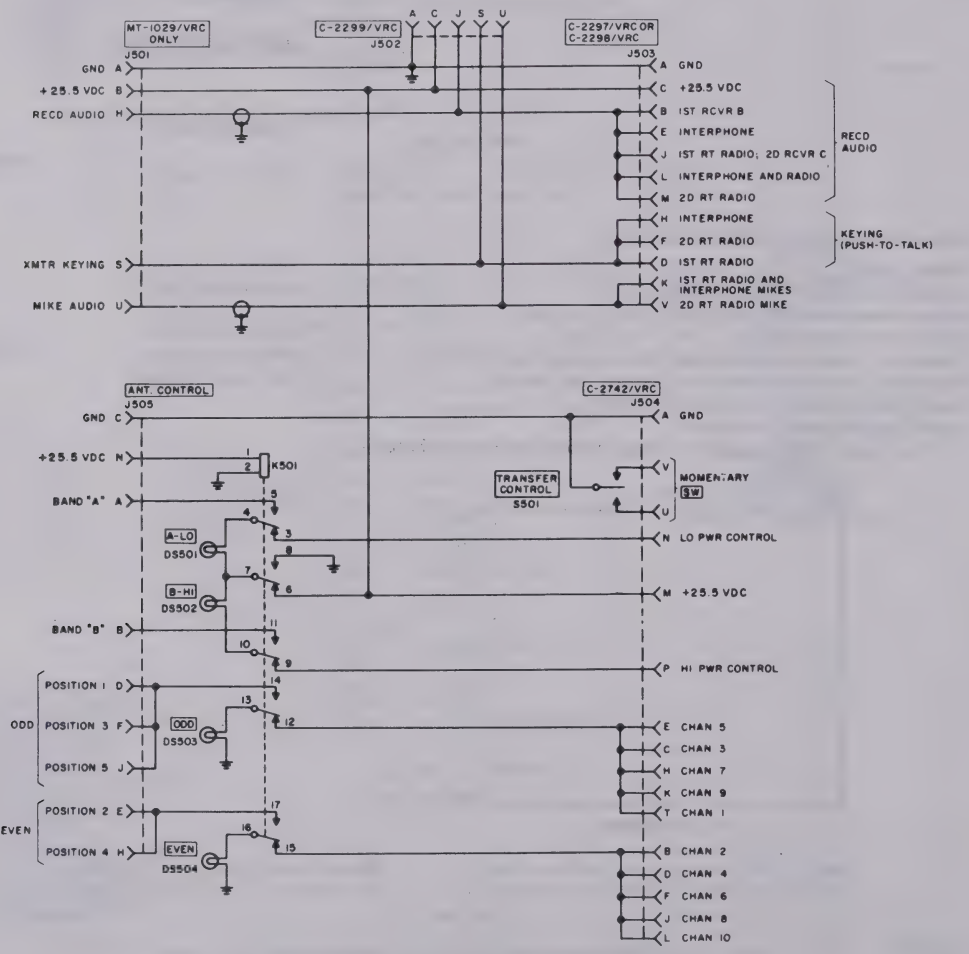


Test Box Dimensions

Test Box Fabrication Details:
Locate cable connectors, indicator lamp assemblies, and toggle switch, approximately as shown.
Use items as templates for required holes.
Stencil panel markings as shown.
Coat stenciling with clear acrylic lacquer or clear varnish.

Test Box Wiring Details:
Connect test box items as shown.
[ ] Indicates test box front cover marking.
All wiring is 14 AWG stranded.
Use shielded wire where indicated.





Test Box Assembly

Adapter Cable Fabrication Details:

Obtain a 3-foot length of unserviceable/salvaged CX-7058/VRC, one connector attached.

Obtain a 2-foot length of unserviceable/salvaged CX-4723/VRC, one connector attached.

Splice the required wires together and solder.

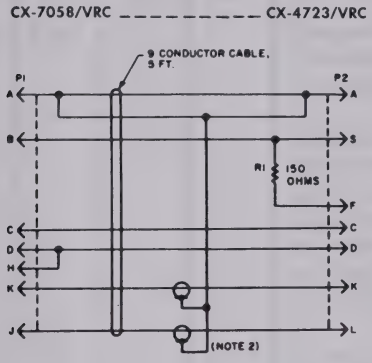
CAUTION

Use care when installing resistor R1 between pins S and F of P2 to be certain that it does not short to the center post of the connector.

Solder the resistor between pins S and F of P2.

Cut off and tape ends of unused wires.

Cover each wire connection and wire joint with electrical insulating tape.



EL9XV063

Adapter, Cable Assembly

NOTES

1. **ADAPTER CABLE REQUIRED ONLY WHEN C-2298/VRC IS USED TO TEST C-2296/VRC.**
2. **TIE SHIELDS TOGETHER AND ATTACH TO PIN A OF P1 AND P2.**
3. **R1 NSN 5905-00-683-2243.**

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Commander
Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703-5007

DATE SENT
10 July 1975

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

BE EXACT. PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2^{o} IFF antenna lag rather than 1^{o}. REASON: Experience has shown that with only a 1^{o} lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2^{o} without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE
SSG I. M. DeSpiritof 999-1776	SSG I. M. DeSpiritof

DA FORM 1 JUL 79 2028-2 PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2028-2

TEAR ALONG PERFORATED LINE

FILL IN YOUR UNIT'S ADDRESS

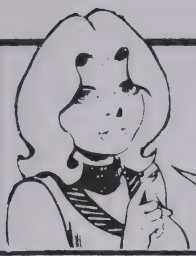
FOLD BACK

DEPARTMENT OF THE ARMY

SAMPLE

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: AMSEL-ME-MP
Fort Monmouth, New Jersey 07703-5007

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



SOMETHING WRONG WITH THIS PUBLICATION?

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS

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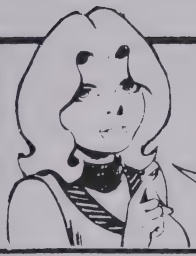

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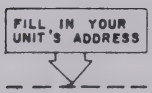

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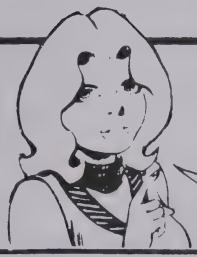

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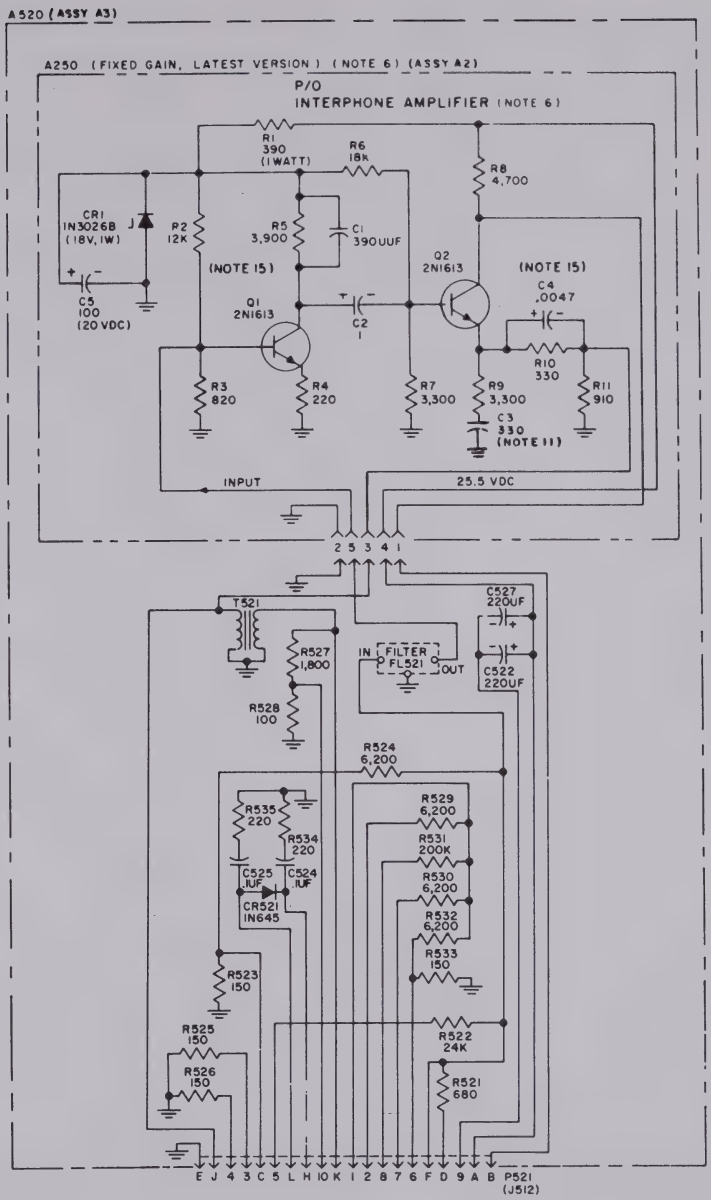


EL9XV064

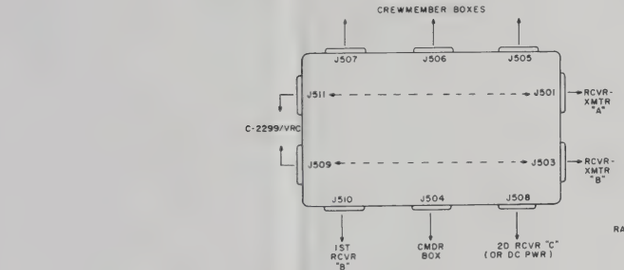
re FO-1. Amplifier, Audio Frequency AM-1780/VRC, Schematic Diagram.

NOTES:

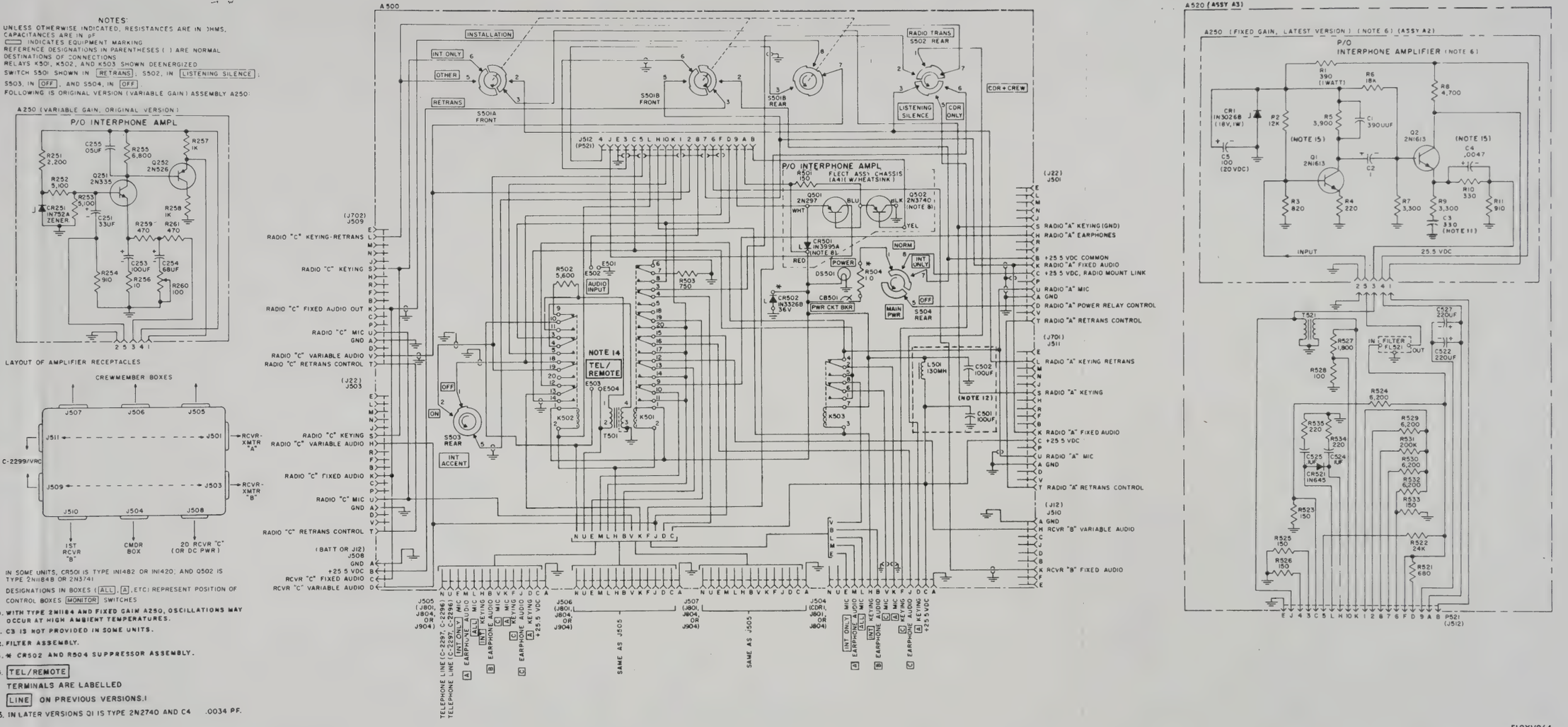
1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN pF.
2. ▭ INDICATES EQUIPMENT MARKING.
3. REFERENCE DESIGNATIONS IN PARENTHESES ( ) ARE NORMAL DESTINATIONS OF CONNECTIONS.
4. RELAYS K501, K502, AND K503 SHOWN DEENERGIZED.
5. SWITCH S501 SHOWN IN [RETRANS]; S502, IN [LISTENING SILENCE]; S503, IN [OFF], AND S504, IN [OFF].
6. FOLLOWING IS ORIGINAL VERSION (VARIABLE GAIN) ASSEMBLY A250:

A250 (VARIABLE GAIN, ORIGINAL VERSION)

7. LAYOUT OF AMPLIFIER RECEPTACLES

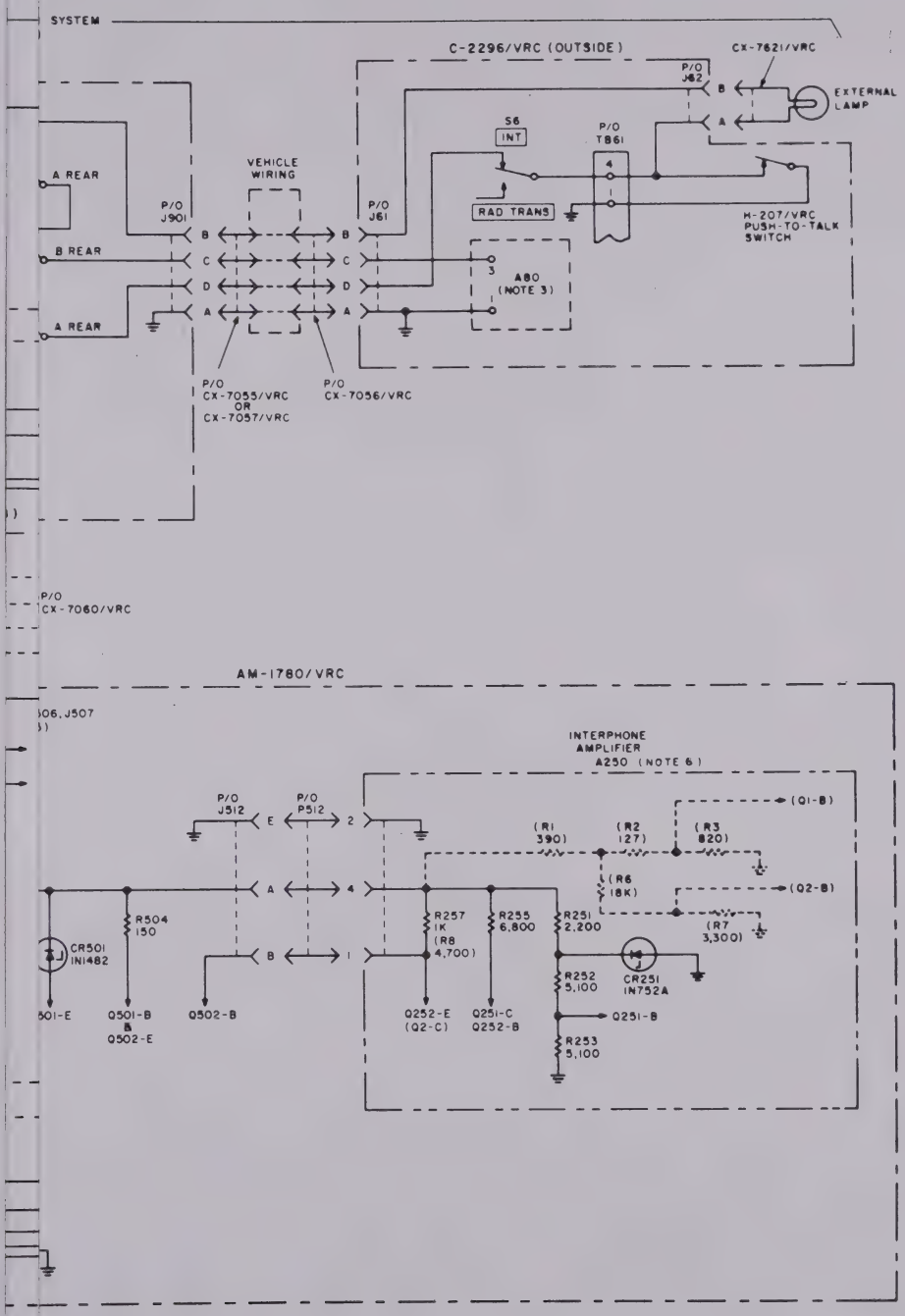


8. IN SOME UNITS, CR501 IS TYPE IN1482 OR IN1420, AND Q502 IS TYPE 2N1184B OR 2N3741.
9. DESIGNATIONS IN BOXES [ALL], [A], ETC. REPRESENT POSITION OF CONTROL BOXES [MONITOR] SWITCHES.
10. WITH TYPE 2N1184 AND FIXED GAIN A250, OSCILLATIONS MAY OCCUR AT HIGH AMBIENT TEMPERATURES.
11. C3 IS NOT PROVIDED IN SOME UNITS.
12. FILTER ASSEMBLY.
13. * CR502 AND R504 SUPPRESSOR ASSEMBLY.
14. [TEL/REMOTE] TERMINALS ARE LABELLED [LINE] ON PREVIOUS VERSIONS.
15. IN LATER VERSIONS Q1 IS TYPE 2N2740 AND C4 .0034 PF.



EL9XV064

Figure FO-1. Amplifier, Audio Frequency AM-1780/VRC, Schematic Diagram.



EL9XV065

Figure FO-2. Power Distribution Circuits of AM-1780/VRC with Radio System and Radio-intercom System.

NOTES

1. RADIO SYSTEM CAN CONSIST OF
   (A) ONE RCVR-XMTR;
   (B) TWO RCVR-XMTRS;
   (C) ONE RCVR-XMTR WITH R-442(M)/VRC; OR
   (D) ONE RCVR-XMTR WITH TWO R-442(M)/VRC'S
   ANY RADIO CONFIGURATION CAN BE USED WITH OR WITHOUT RADIO-INTERCOM SYSTEM. (SEE NOTE 2.)
2. WITH LINK IN POSITION SHOWN, POWER FOR BOTH RADIO(S) AND RADIO-INTERCOM SYSTEM IS CONTROLLED BY MAIN PWR SWITCH IN AM-1780/VRC. WHEN RADIO-INTERCOM SYSTEM IS NOT USED WITH THE RADIO SYSTEM, THE LINK MUST BE POSITIONED AS SHOWN IN DASHED LINES.
3. ASSEMBLY A80, SHOWN IN C-2298/VRC, C-2297/VRC, AND C-2296/VRC, IS IDENTICAL. CIRCUIT DETAILS ARE SHOWN ONLY IN C-2298/VRC.
4. CX-4723/VRC IS USED INSTEAD OF VEHICLE WIRING AND CX-7060/VRC'S IN SOME VEHICLE INSTALLATIONS.
5. C-2298/VRC'S FOR CREWMEMBERS ARE ALSO CONNECTED TO J505, J506, AND J507.
6. PARTS IN PARENTHESES ARE USED IN HIGH GAIN VERSION OF A250.
7. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.
8. [ ] INDICATES EQUIPMENT MARKING.

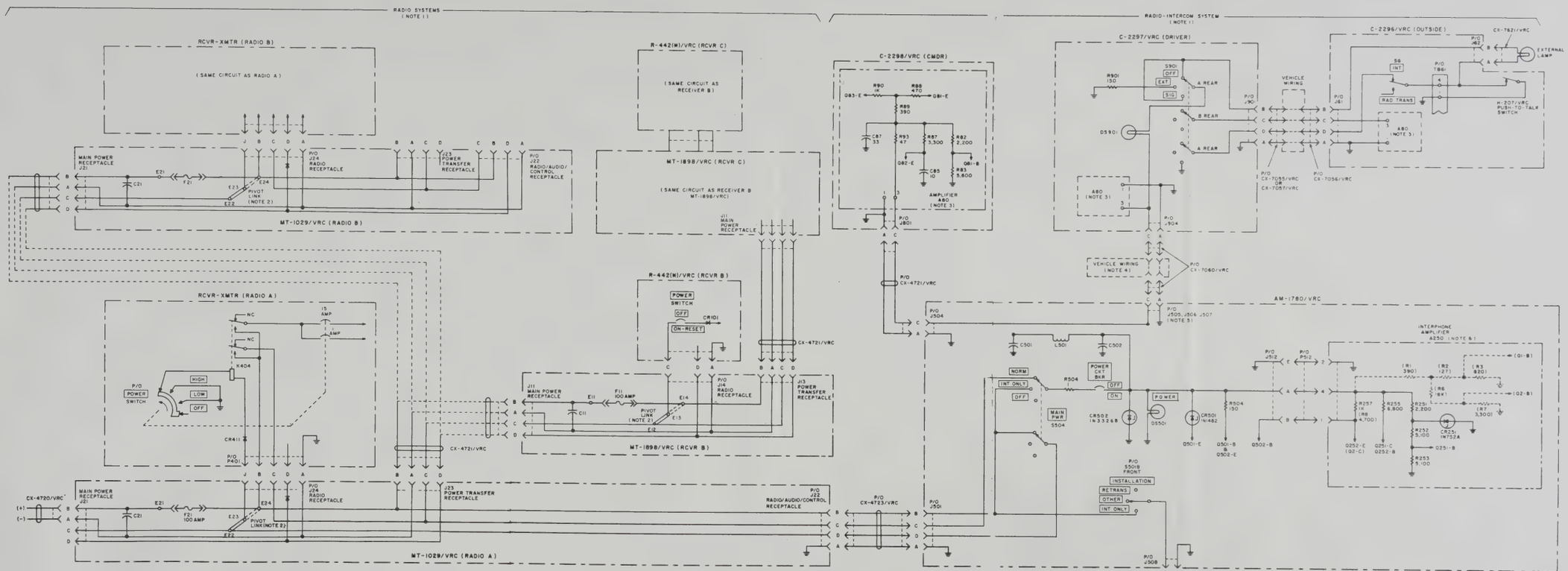
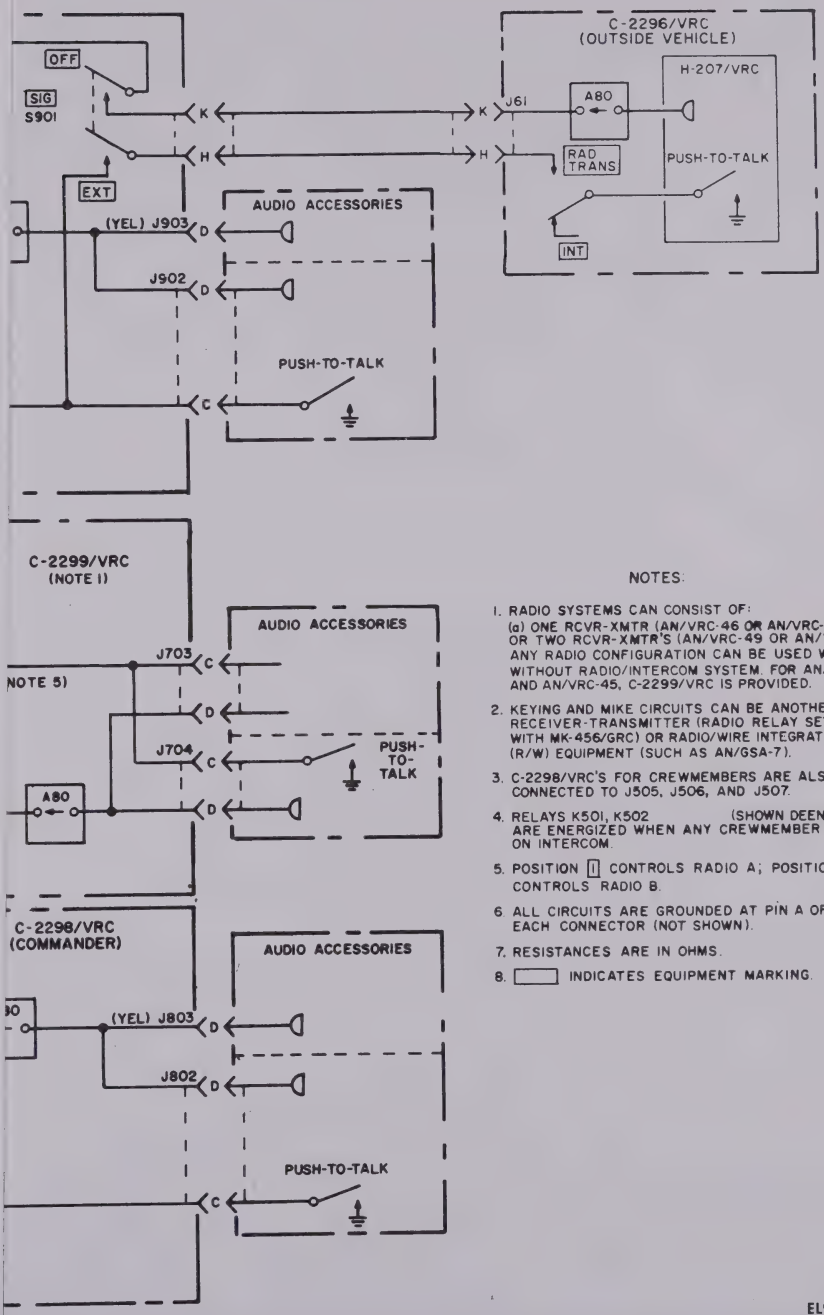


Figure FO-2. Power Distribution Circuits of AM-1780/VRC with Radio System and Radio-intercom System

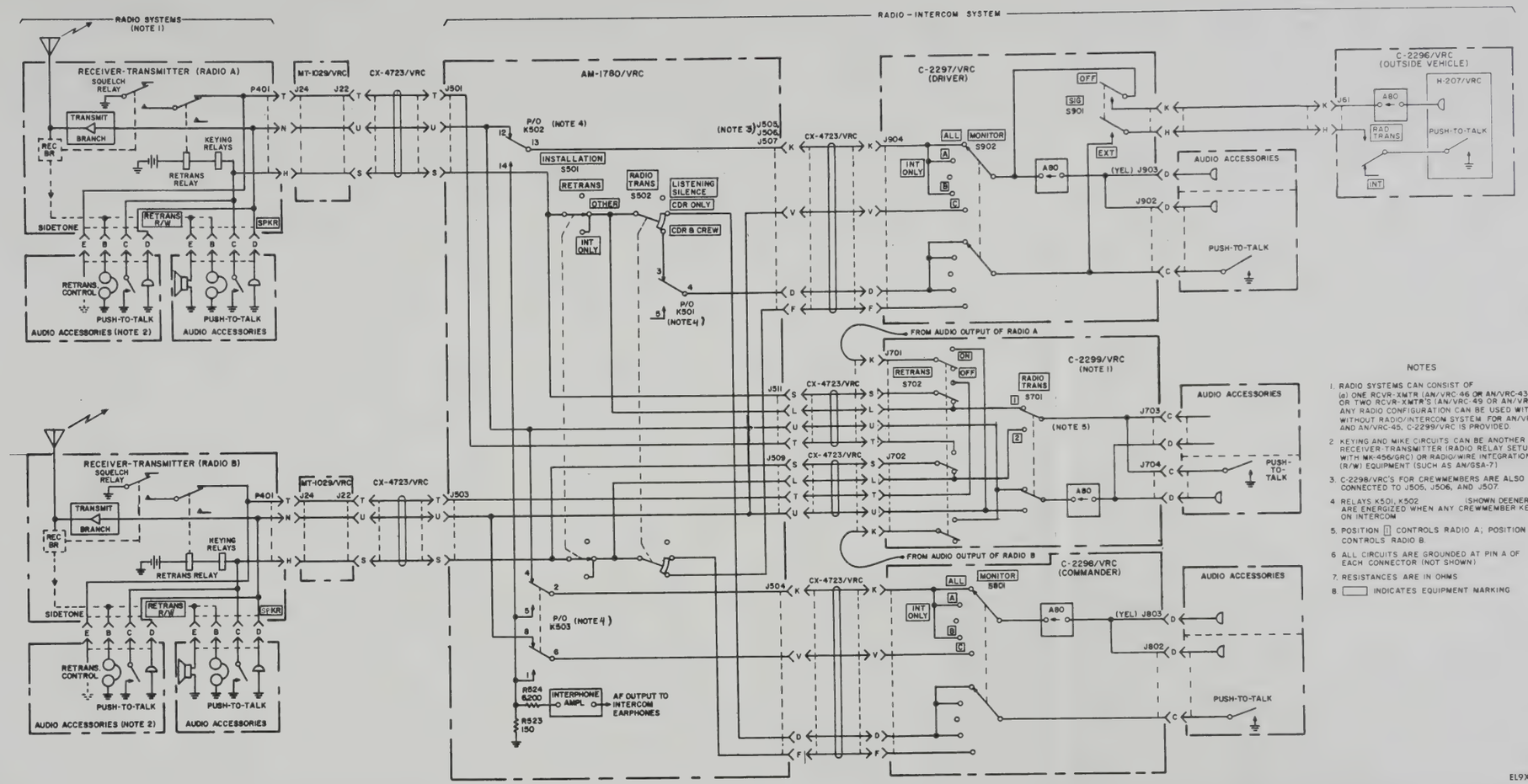


NOTES:

1. RADIO SYSTEMS CAN CONSIST OF:
   (a) ONE RCVR-XMTR (AN/VRC-46 OR AN/VRC-43);
   OR TWO RCVR-XMTR'S (AN/VRC-49 OR AN/VRC-45).
   ANY RADIO CONFIGURATION CAN BE USED WITH OR WITHOUT RADIO/INTERCOM SYSTEM. FOR AN/VRC-49 AND AN/VRC-45, C-2299/VRC IS PROVIDED.
2. KEYING AND MIKE CIRCUITS CAN BE ANOTHER RECEIVER-TRANSMITTER (RADIO RELAY SETUP WITH MK-456/GRC) OR RADIO/WIRE INTEGRATION (R/W) EQUIPMENT (SUCH AS AN/GSA-7).
3. C-2298/VRC'S FOR CREWMEMBERS ARE ALSO CONNECTED TO J505, J506, AND J507.
4. RELAYS K501, K502 (SHOWN DEENERGIZED) ARE ENERGIZED WHEN ANY CREWMEMBER KEYS ON INTERCOM.
5. POSITION [1] CONTROLS RADIO A; POSITION [2] CONTROLS RADIO B.
6. ALL CIRCUITS ARE GROUNDED AT PIN A OF EACH CONNECTOR (NOT SHOWN).
7. RESISTANCES ARE IN OHMS.
8. [ ] INDICATES EQUIPMENT MARKING.

EL9XV066

Figure FO-3. Radio Transmission and Keying Circuits of AM-1780/VRC with Radio System and Radio-intercom System.

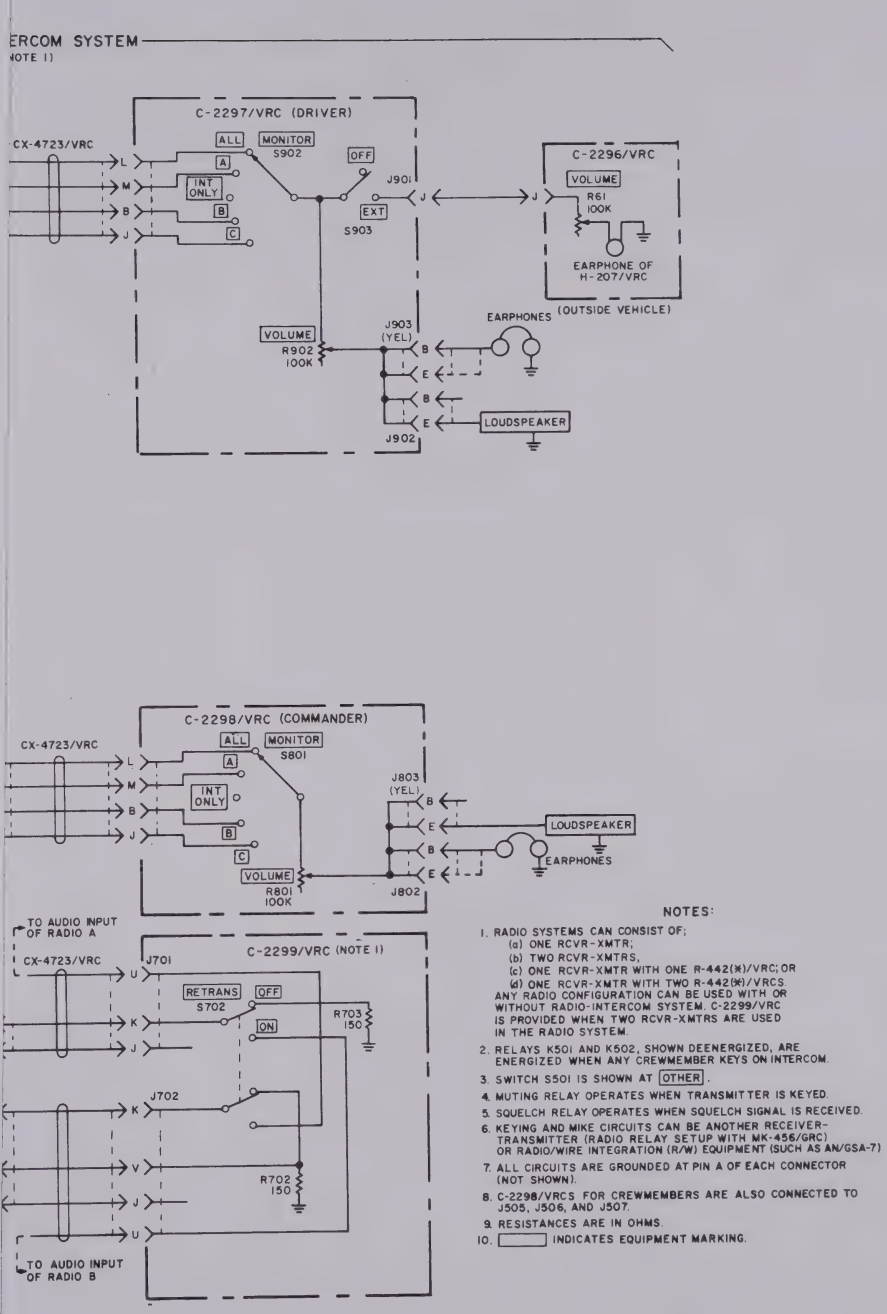


NOTES

1. RADIO SYSTEMS CAN CONSIST OF (a) ONE RCVR-XMTR (AN/VRC-46 OR AN/VRC-43), OR TWO RCVR-XMTR'S (AN/VRC-49 OR AN/VRC-45) ANY RADIO CONFIGURATION CAN BE USED WITH OR WITHOUT RADIO/INTERCOM SYSTEM. FOR AN/VRC-49 AND AN/VRC-45, C-2299/VRC IS PROVIDED.
2. KEYING AND MIKE CIRCUITS CAN BE ANOTHER RECEIVER-TRANSMITTER (RADIO RELAY SETUP WITH MK-456/GRC) OR RADIO-WIRE INTEGRATION (R/W) EQUIPMENT (SUCH AS AN/GSA-7).
3. C-2298/VRC'S FOR CREWMEMBERS ARE ALSO CONNECTED TO J505, J506, AND J507.
4. RELAYS K501, K502 (SHOWN DEENERGIZED) ARE ENERGIZED WHEN ANY CREWMEMBER KEYS ON INTERCOM.
5. POSITION [1] CONTROLS RADIO A; POSITION [2] CONTROLS RADIO B.
6. ALL CIRCUITS ARE GROUNDED AT PIN A OF EACH CONNECTOR (NOT SHOWN).
7. RESISTANCES ARE IN OHMS.
8. [ ] INDICATES EQUIPMENT MARKING.

EL9XV066

Figure FO-3. Radio Transmission and Keying Circuits of AM-1780/VRC with Radio System and Radio-intercom System.

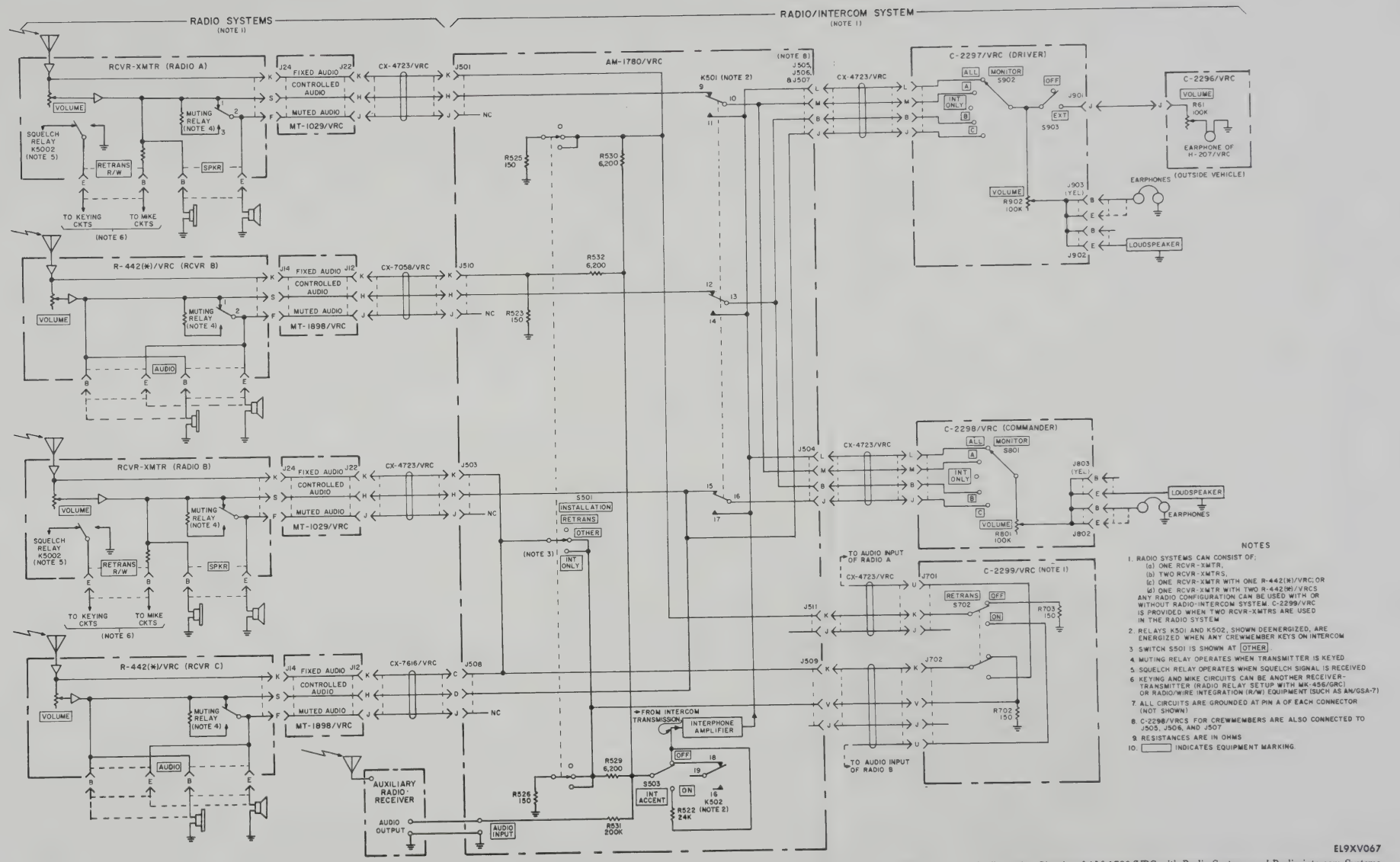


NOTES:

1. RADIO SYSTEMS CAN CONSIST OF;
   (a) ONE RCVR-XMTR;
   (b) TWO RCVR-XMTRS,
   (c) ONE RCVR-XMTR WITH ONE R-442(*)/VRC; OR
   (d) ONE RCVR-XMTR WITH TWO R-442(*)/VRCS.
   ANY RADIO CONFIGURATION CAN BE USED WITH OR WITHOUT RADIO-INTERCOM SYSTEM. C-2299/VRC IS PROVIDED WHEN TWO RCVR-XMTRS ARE USED IN THE RADIO SYSTEM.
2. RELAYS K501 AND K502, SHOWN DEENERGIZED, ARE ENERGIZED WHEN ANY CREWMEMBER KEYS ON INTERCOM.
3. SWITCH S501 IS SHOWN AT [OTHER].
4. MUTING RELAY OPERATES WHEN TRANSMITTER IS KEYED.
5. SQUELCH RELAY OPERATES WHEN SQUELCH SIGNAL IS RECEIVED.
6. KEYING AND MIKE CIRCUITS CAN BE ANOTHER RECEIVER-TRANSMITTER (RADIO RELAY SETUP WITH MK-456/GRC) OR RADIO/WIRE INTEGRATION (R/W) EQUIPMENT (SUCH AS AN/GSA-7)
7. ALL CIRCUITS ARE GROUNDED AT PIN A OF EACH CONNECTOR (NOT SHOWN).
8. C-2298/VRCS FOR CREWMEMBERS ARE ALSO CONNECTED TO J505, J506, AND J507.
9. RESISTANCES ARE IN OHMS.
10. [ ] INDICATES EQUIPMENT MARKING.

EL9XV067

Figure FO-4. Radio Reception Circuits of AM-1780/VRC with Radio Systems and Radio-intercom Systems.



EL9XV067

Figure FO-4. Radio Reception Circuits of AM-1780/VRC with Radio Systems and Radio-intercom Systems.

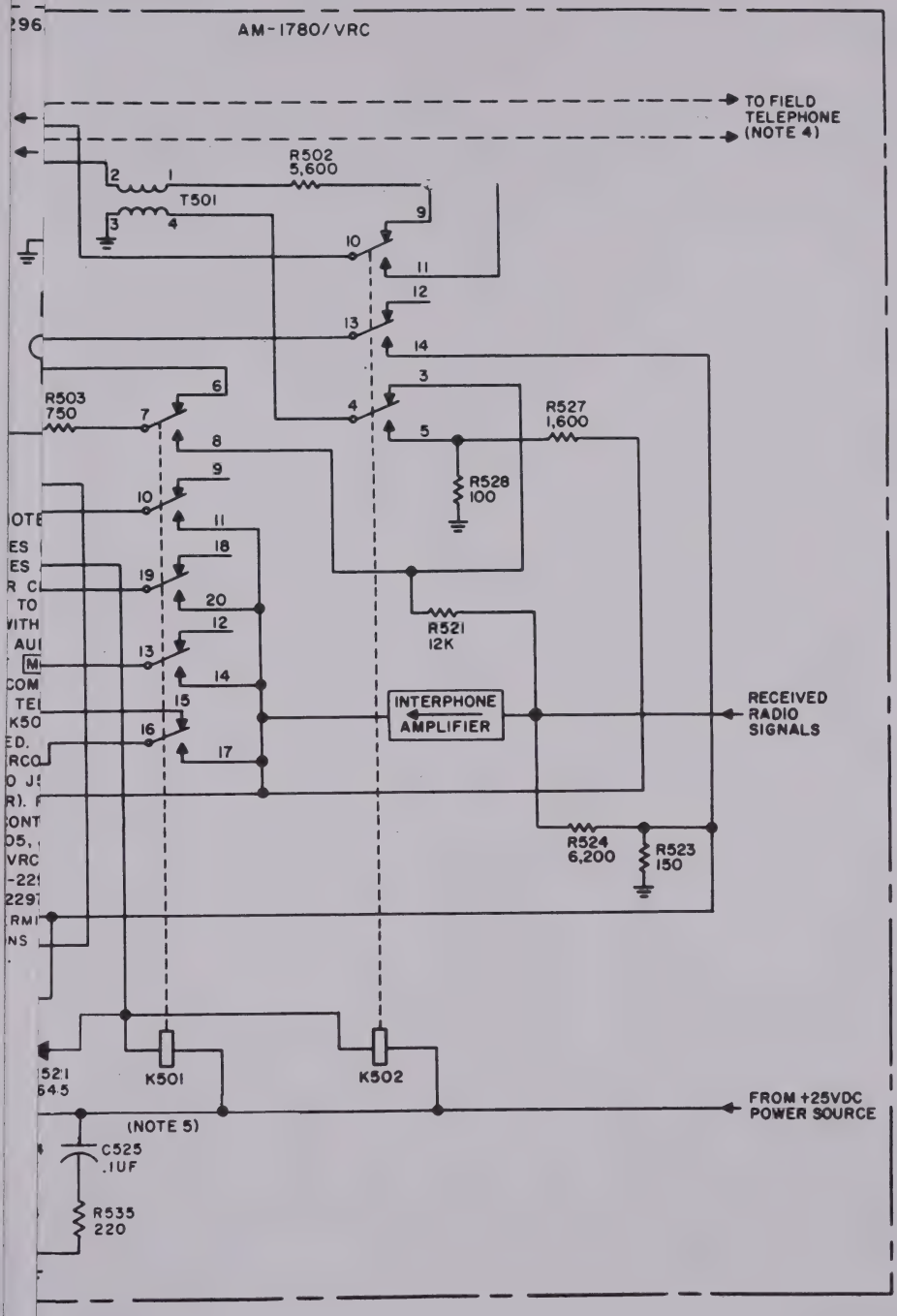
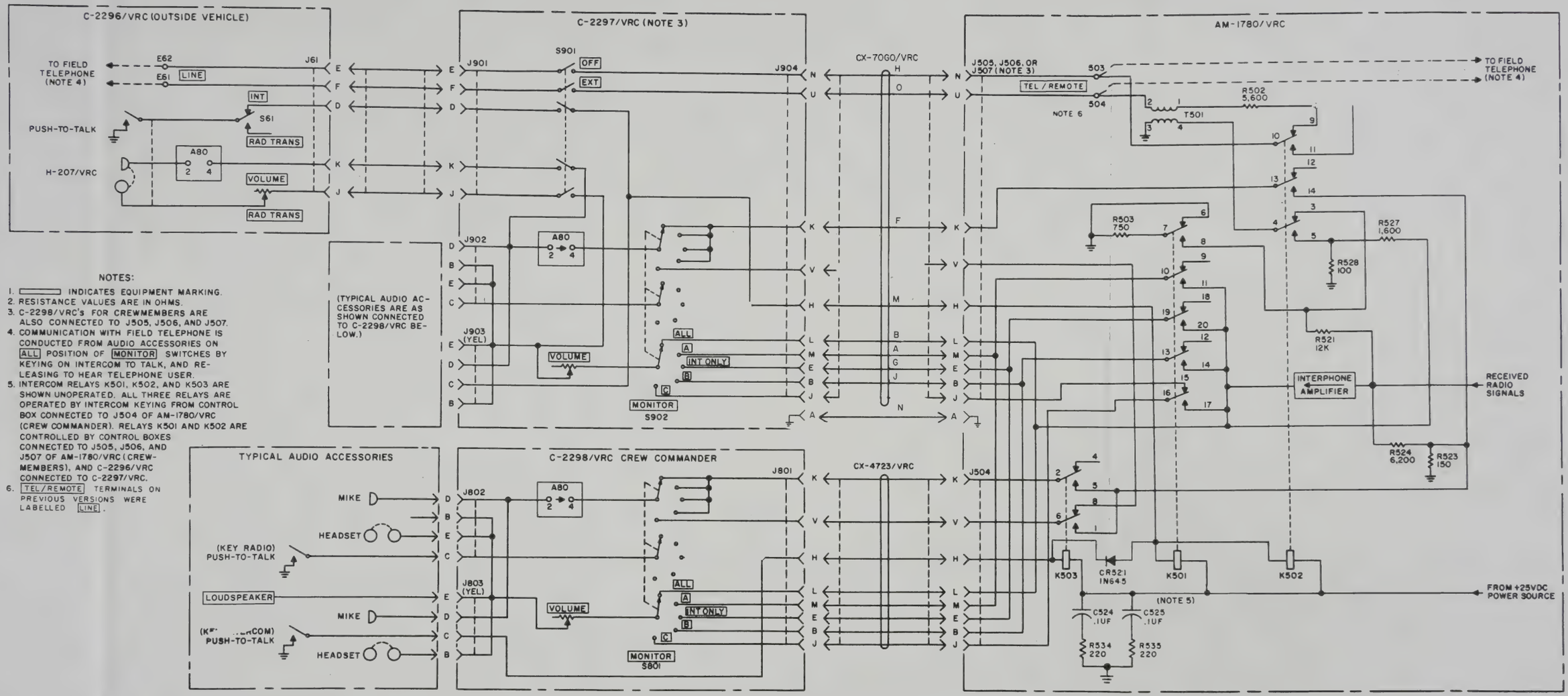


Figure FO-5. Intercom Transmission and Reception of AM-1780/VRC and Crewmember Control Boxes.



NOTES:

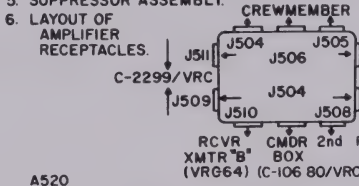
1. ▭ INDICATES EQUIPMENT MARKING.
2. RESISTANCE VALUES ARE IN OHMS.
3. C-2298/VRC's FOR CREWMEMBERS ARE ALSO CONNECTED TO J505, J506, AND J507.
4. COMMUNICATION WITH FIELD TELEPHONE IS CONDUCTED FROM AUDIO ACCESSORIES ON ALL POSITION OF MONITOR SWITCHES BY KEYING ON INTERCOM TO TALK, AND RELEASING TO HEAR TELEPHONE USER.
5. INTERCOM RELAYS K501, K502, AND K503 ARE SHOWN UNOPERATED. ALL THREE RELAYS ARE OPERATED BY INTERCOM KEYING FROM CONTROL BOX CONNECTED TO J504 OF AM-1780/VRC (CREW COMMANDER). RELAYS K501 AND K502 ARE CONTROLLED BY CONTROL BOXES CONNECTED TO J505, J506, AND J507 OF AM-1780/VRC (CREWMEMBERS), AND C-2296/VRC CONNECTED TO C-2297/VRC.
6. TEL/REMOTE TERMINALS ON PREVIOUS VERSIONS WERE LABELLED LINE.

EL9XV068

Figure FO-5. Intercom Transmission and Reception of AM-1780/VRC and Crewmember Control Boxes.

NOTES

1. UNLESS OTHERWISE STATED RESISTANCES ARE IN OHMS, AND CAPACITANCES ARE IN MICROMICROFARADS.
2. CASE OF Q502 IS GROUND.
3. RELAYS SHOWN DEENERGIZED; K502 AND K503, ENERGIZED WHEN ANY CREWMEMBER (J505, J506, J507) KEYS ON INTERCOM; K501, K502, K503 ENERGIZED WHEN COMMANDER (J504, KEYS ON INTERCOM.
4. ▭ INDICATES EQUIPMENT MARKING.
5. SUPPRESSOR ASSEMBLY.
6. LAYOUT OF AMPLIFIER RECEPTACLES.



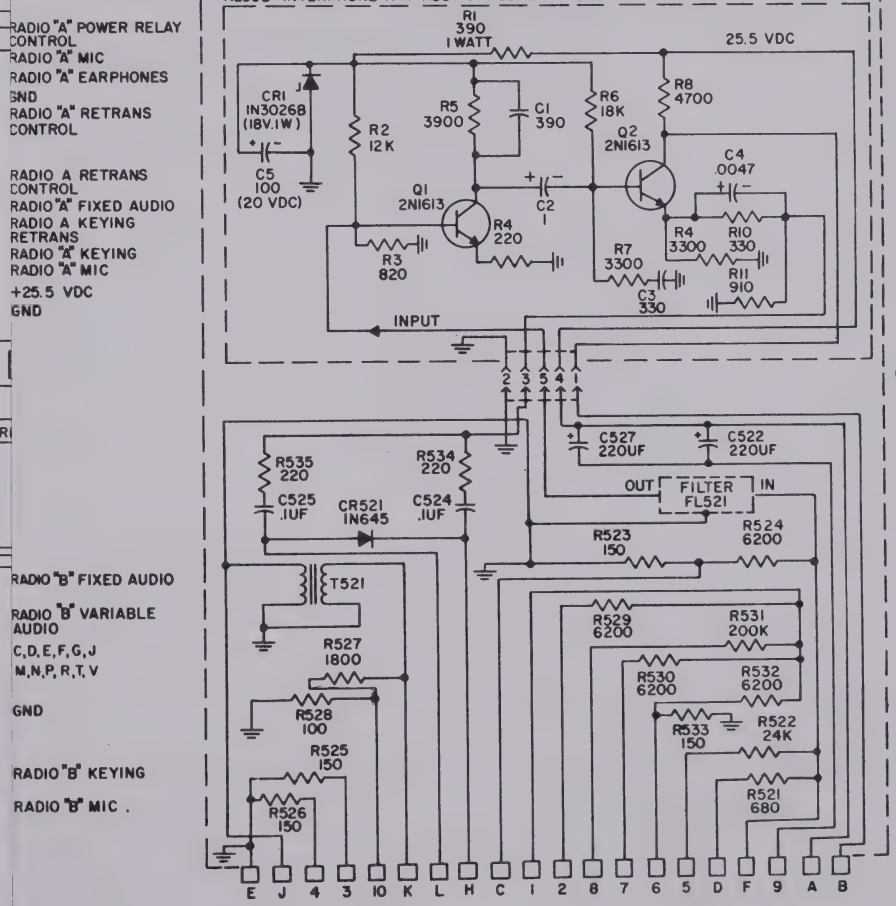
7.

SWITCH	POS.
S501	OTHER
S502	LISTENING SILENCE
S503	OFF
S504	OFF

RADIO "A" KEYING (GND)
+25.5 VDC (RADIO MOUNT LINK)
+25.5 VDC, COMMON
RADIO "A" FIXED AUDIO

A520
A2508 INTERPHONE AMP ASSY (FIXED GAIN VERSION)

RADIO "A" POWER RELAY CONTROL
RADIO "A" MIC
RADIO "A" EARPHONES
GND
RADIO "A" RETRANS CONTROL
RADIO A RETRANS CONTROL
RADIO "A" FIXED AUDIO
RADIO A KEYING RETRANS
RADIO "A" KEYING
RADIO "A" MIC
+25.5 VDC
GND



RADIO "B" FIXED AUDIO
RADIO "B" VARIABLE AUDIO
C, D, E, F, G, J
M, N, P, R, T, V
GND
RADIO "B" KEYING
RADIO "B" MIC .

EL9XV069

ncy AM-7046/VRC Schematic Diagram (used with C-10680/VRC in Interim Fire Support Test Vehicle M113A1 IFIST).

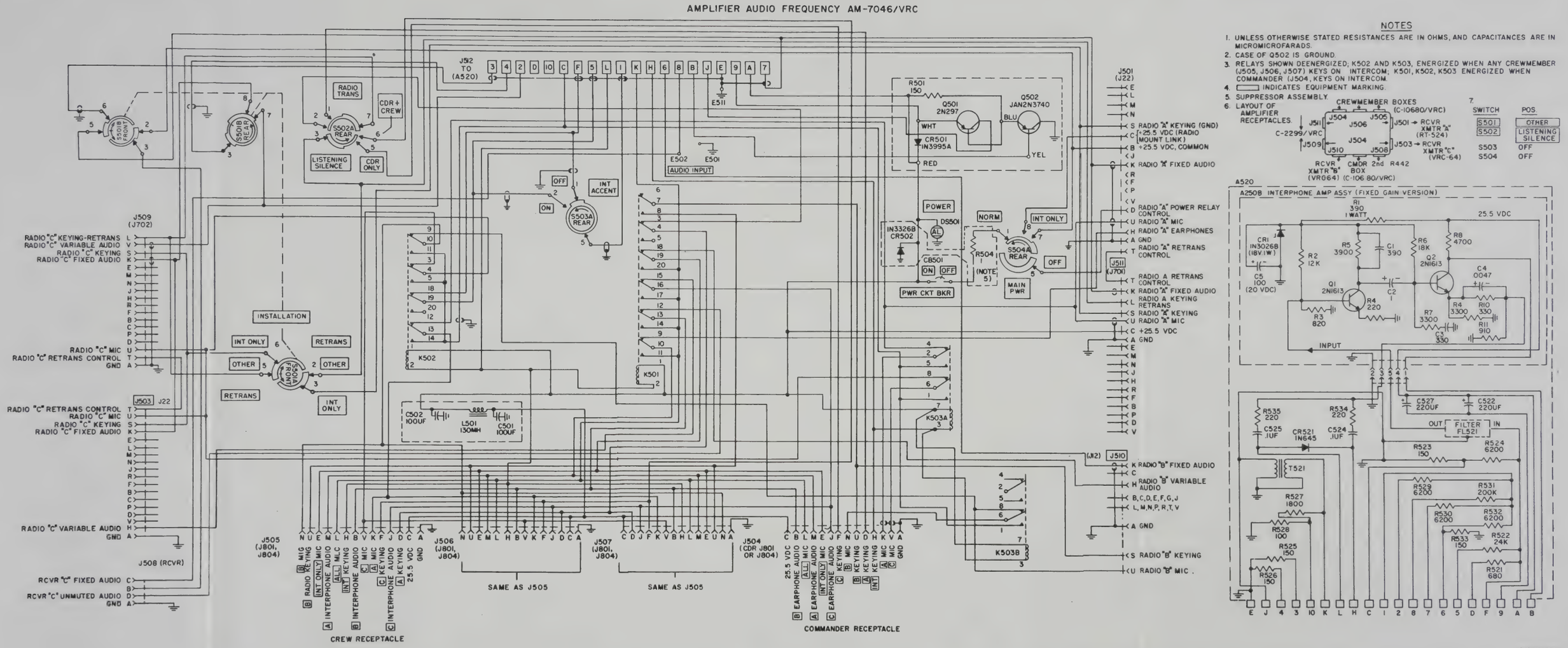
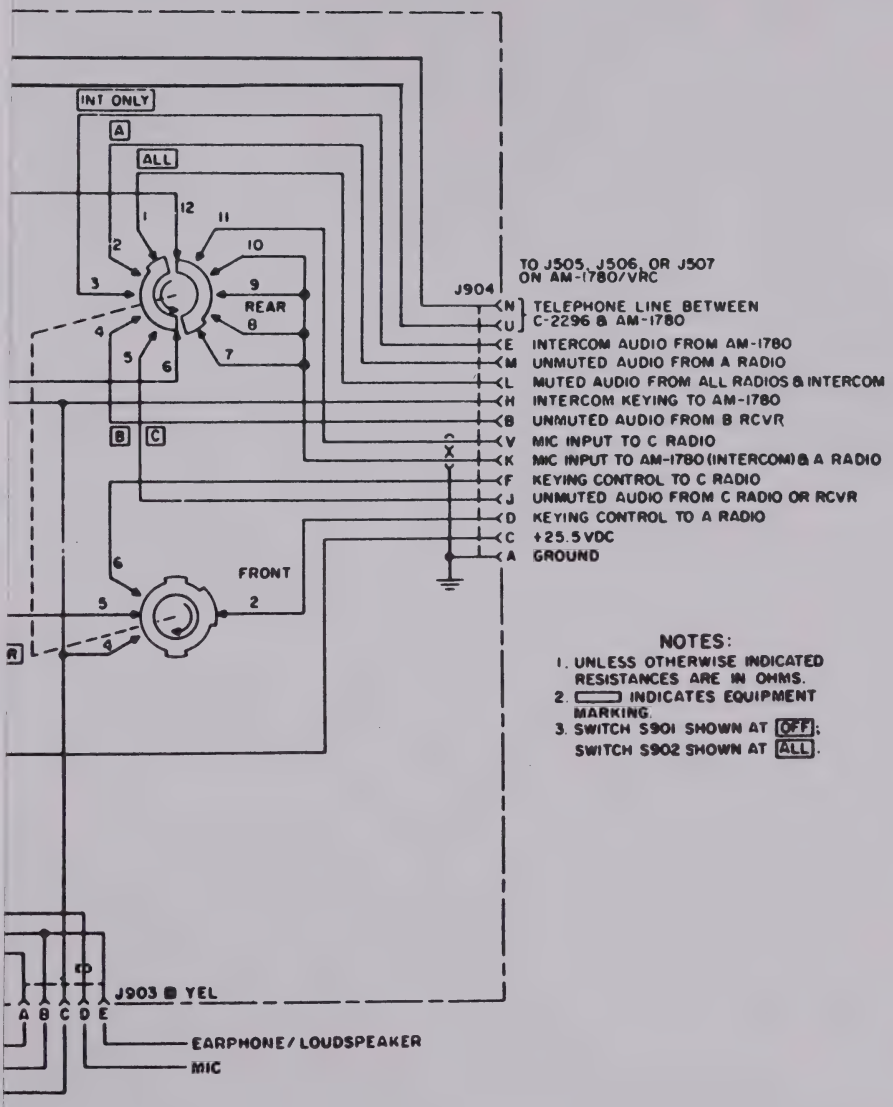
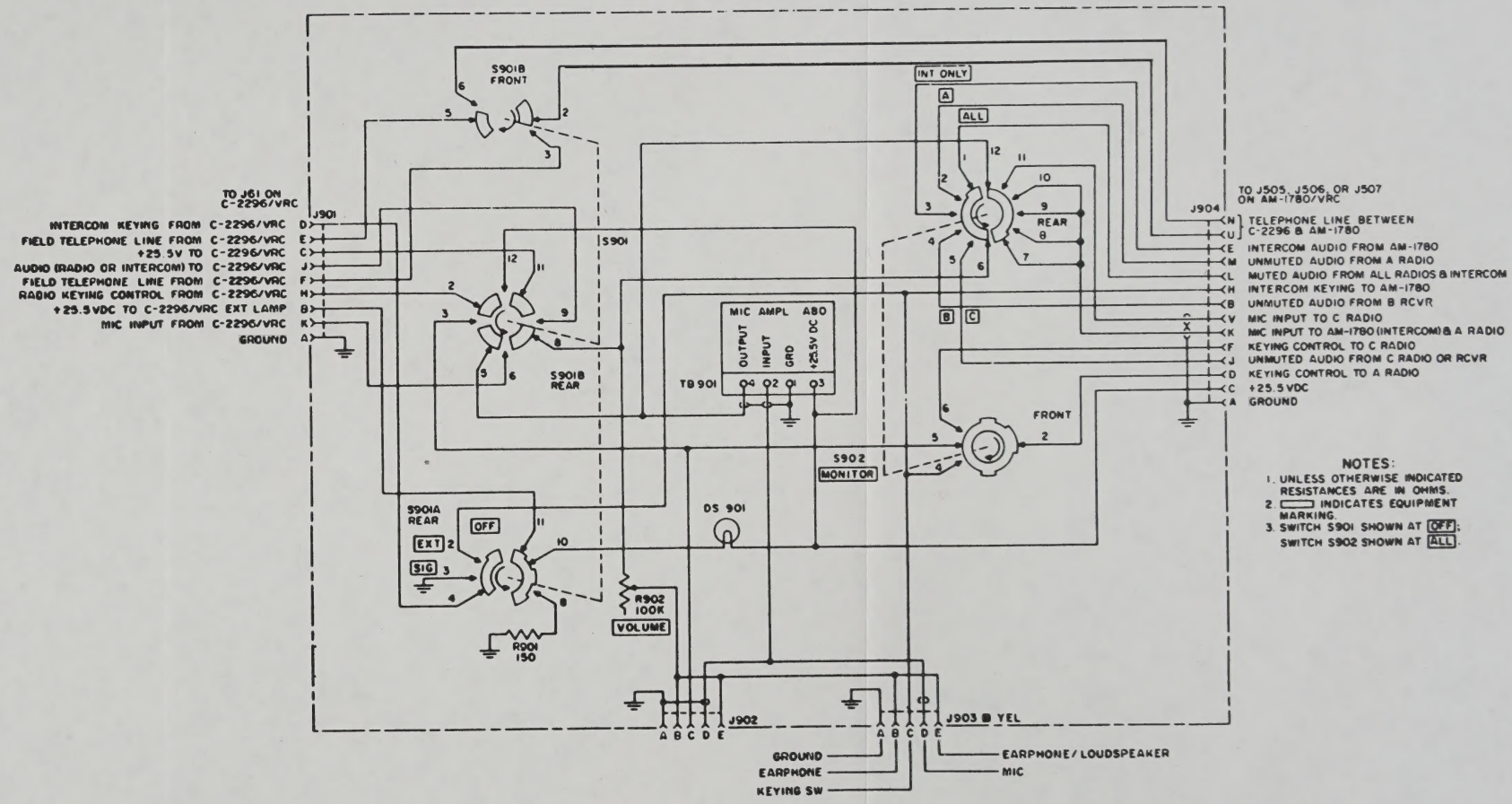


Figure FO-6. Amplifier, Audio Frequency AM-7046/VRC Schematic Diagram (used with C-10680/VRC in Interim Fire Support Test Vehicle M113A1 IFIST).



EL9XV070

Figure FO-7. C-2297/VRC, Schematic Diagram.

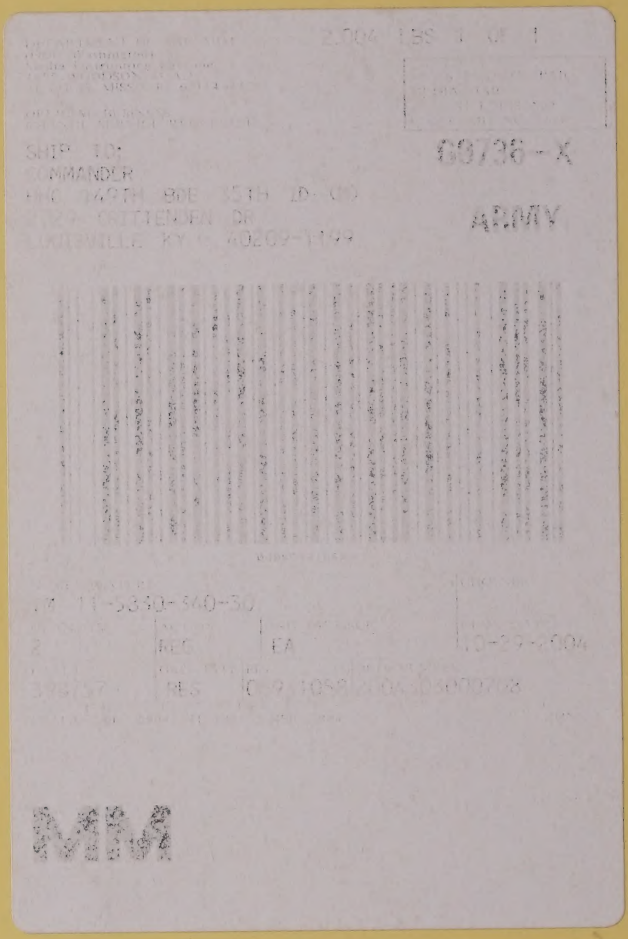


NOTES:

1. UNLESS OTHERWISE INDICATED RESISTANCES ARE IN OHMS.
2. ▭ INDICATES EQUIPMENT MARKING.
3. SWITCH S901 SHOWN AT OFF; SWITCH S902 SHOWN AT ALL.

EL9XV070

Figure FO-7. C-2297/VRC, Schematic Diagram.



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